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POPULAR FALLACIES

EXPLAINED AND CORRECTED

(With copious references to authorities)

BY

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"THE UTILIZATION OF SOLAR ENERGY";
"THE PHYSICAL PROPERTIES OF CLAY";
"BACON AND SHAKESPEARE," AND MANY TECHNICAL PAPERS.

THIRD EDITION

With an Introduction by

SIR RICHARD GREGORY, Hon. D.Sc.(Leeds), F.R.A.S

LONDON:
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To the Memory of my Father

WHO EARLY TAUGHT ME BY PRECEPT

AND EXAMPLE THE HABITS OF A STUDENT-LIFE.

BIBLIOGRAPHY

Vulgar or Common Errors (1646), by Sir Thomas Browne, M.D. $7\frac{1}{8} \times 4\frac{1}{2}$ ins., 752 pp., 189 errors.

A New Catalogue of Vulgar Errors (1767), by Stephen Fovargue, A.M. $7\frac{7}{8} \times 4\frac{5}{8}$ ins., 202 pp., 36 errors.

Medical, Philosophical and Vulgar Errors (1797), by John Jones, M.B. $8\frac{7}{8} \times 5\frac{1}{2}$ ins., 213 pp., 21 errors.

Popular Errors (1840), by John Timbs, F.S.A. $6\frac{1}{2} \times 4$ ins., 241 pp., about 500 errors.

Vulgar Errors (1845), by "Sir Thomas Brown Redivivus." [Caroline Frances Cornwallis.] $6\frac{3}{4} \times 4\frac{1}{8}$ ins., 132 pp., about 40 errors.

The Mistakes We Make (1897), by C. E. Clark. $6\frac{5}{8} \times 4\frac{1}{8}$ ins., 231 pp., about 330 mistakes.

More Mistakes We Make (1901), by C. E. Clark. $7 \times 4\frac{5}{8}$ ins., 150 pp., about 44 mistakes.

[NOTE.—The references to *Ency. Brit.* are to the ninth edition unless any other edition is named.]

Note *re* trisection of an angle ; p. 790. In 1885 Klein *proved* that this could not be done by Euclidian methods.

PREFACE TO THE THIRD EDITION

IF we suspect an error and have the time and means of looking it up, all may be well; but it is another story when we have no doubt about some statement and consequently accept what is false for the truth. This book, therefore, does two things: if read it calls attention to many things which are not what they are said to be; if referred to when a person is in doubt, it saves an immense amount of his time in hunting for the necessary information, for even when in doubt the difficulty arises where to find the required information.

Those who read this book will readily grant that its preparation has involved an immense amount of work for *one* person. If every reader had to expend even a quarter of the labour of looking up matters upon which he is in doubt, the aggregate amount of work would be stupendous. By eliminating this once for all for his readers the author hopes he has rendered an economic service.

In order to make the treatment as "satisfying" as possible the exact quotations from the various authorities have been given, and also the references, so that those who wish may go more fully into the points raised.

The 1909 edition contains 460 fallacies collected in 15 years. The present volume deals with 1,350, of which 890 are entirely new fallacies in the sense that they are in addition to the original 460.

In some few instances new fallacies have arisen since the last edition was published, owing—though it seems strange to say so—to the advance in our knowledge and occupations: *e.g.*, the science and art of flying and "wireless" have given birth to new errors.

If an apology were needed for the publication of such a book, we have it in a paragraph in Sir Francis Bacon's *Advancement of Learning* (1605) printed on the fly-leaf of this edition. It is a particularly interesting paragraph, for it was published in the year in which Sir Thomas Browne was born. In 1646 Sir Thomas published his *Vulgar Errors*, and considering the mentality of these two men, and the books available in those times, it is highly probable that Browne

read Bacon's *Advancement of Learning* and acted on the suggestion contained in the paragraph we have quoted.

The author has again the pleasing duty of thanking many friends and correspondents about the World for the assistance he has received from them in the form of notes, information, and criticism, and hopes that they will continue their kind offices. There are too many to name here, but most of them will find their names recorded in connection with the particular information which they were good enough to supply.

One must be mentioned here and specially thanked for his painstaking, reliable, voluminous and disinterested work —Mr. Donald Gunn. In many cases Mr. Gunn's MS. has been simply added verbatim to that of the author, and acknowledged in the article in question. In other cases his notes have been used freely in the writing of the articles.

To Mr. J. W. Jarvis, F.G.S., the author's thanks are given for many notes and the reading and "cutting" of the MS. so as to reduce it even to its present still large dimensions.

Dr. Robt. Bryant, B.A., D.Sc.(Lond.), and Mrs. Bryant have kindly prepared the index, an important part of such a book, for which the readers will be as grateful as the author.

In the preface to the first edition (1907) the author acknowledged in particular the assistance he had from *The Mistakes We Make* (1897), by Mr. C. E. Clark; but it was not till some years after the new and enlarged edition of *Popular Fallacies* (1909) was published that he learned of Mr. Clark's *More Mistakes We Make* (1901). The author now wishes to thank Mr. Clark for the use his second work has been to him in the preparation of this volume.

A. S. E. Ackermann.

17, Victoria Street,
Westminster, S.W. 1.
August, 1923.

INTRODUCTION

CHARLES LAMB once remarked that a man could not be altogether happy in the company of his schoolmaster. The reader of this book may similarly become depressingly conscious of his numerous mistakes; or, on the other hand, he may, by unseemly intrusion or insistent correction, develop into a captious critic whose presence in friendly conversational circles is best avoided. Mr. Ackermann does not desire to produce either of these types of mind, but rather to provide a work of reference which all who prefer precision to uncertainty or inaccuracy may consult with advantage. He disposes of many cherished beliefs, but what he offers in their place is so interesting and reasonable that most people will be grateful for the enlightenment he gives. Many such beliefs are, after all, nothing but the vestiges of a primitive stage of mental development—interesting enough in their way, but doomed to disappearance by disuse. To Mr. Ackermann these relics of the past are tokens presented as modern currency, and he relentlessly nails them to the counter.

The field surveyed is very extensive, and some sections of it are strange to me, but I have derived both pleasure and profit from excursions into all its parts. The portions concerned with common mistakes regarding natural occurrences and phenomena, and technical aspects of science, are of particular interest. It was Descartes who undertook the study of science "to learn how to distinguish truth from falsehood, in order to be clear about my actions, and to walk sure-footedly in this life." Mr. Ackermann seems likewise to have been possessed of the same spirit when he spread his net to catch the fallacies here harvested. He is not concerned with the nature of knowledge, or with philosophical considerations of it, but with the clear and distinct thought without which the mind is in a state of indifference; and he would accept the Cartesian principle that we should in all cases suspend our judgment until it can be determined in the full light of knowledge.

The intensity, as well as the interest of the zone of illumination varies at different epochs, and in this book many obscure allusions and ideas are brought within the beam. What serve as explanations at one time have to be discarded as further knowledge is gained. In the childhood of the race, objects and forces manifested in earth and sky were all endowed by man with human attributes, and phenomena were interpreted as expressions of personal action. Science has destroyed these images, and has displayed the universe as a place of law and order which it is the privilege of man to explore and understand. We may still find pleasure in the poetry of such an idea as that of the earth as the sleeping princess brought to life by the kiss of the sun-prince ; but we accept it as a beautiful myth and not as a satisfying explanation of the passage of night into day. So long as we are able to distinguish between the imaginary and the real, either as regards experience or interpretation, we need not fear the supersession of the old knowledge by the new, but should rather rejoice at the closer approach to truth secured for us through scientific reflection upon the evidences of our senses.

It is easy, of course, for our senses to deceive us, and for our interpretations of events to be incorrect. Many mistakes or fallacies have their origin in such judgments. It was reasonable to suppose that the sun actually travels around the earth, and not the earth around the sun ; and, so far as the phenomena of day and night and the succession of the seasons are concerned the heliocentric and the geocentric theories are equally satisfactory as explanations of them. What seemed to be obvious to most people in earlier times proves, however, to be untrue, and we accept the Copernican theory because it provides the simplest plan of the movements not only of the sun but also of the other celestial bodies, while the law of gravitation is sufficient to explain the movements, though we know nothing about the nature of gravitation itself. Argument which passes for decisive knowledge at one epoch is thus shown to be fallacy in another ; but what survives the critical judgment of all ages is accurate observation. Theories change with the generations, but a fact or phenomenon correctly seen and faithfully recorded prevails because it is true.

In these days we are not so content, as Aristotle and most of the other Greek philosophers were, in making inquiries into causes of phenomena chiefly searches for words and phrases.

Following Locke, the modern man of science would in general insist that all the knowledge with which he is concerned springs from experience, and that there are no "innate" ideas in the mind. This view leads to distrust of merely verbal knowledge and makes a demand for accurate statement founded upon close observation, and supplemented whenever possible by the test of experiment. Measured by these standards, much of what is even now commonly accepted as sound conceptions or conclusions is found to be fallacious; and Mr. Ackermann has undertaken the task of exposing many of these errors. He does not pretend to do more than deal with mistakes frequently made, or to take all knowledge as his province, as did Francis Bacon, but he has been successful in bringing together much information upon a great variety of subjects; and to know what is contained within the covers of this book is to have a practical as well as a liberal education.

R. A. Gregory.

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QUOTATIONS

" Time's glory is to calm contented Kings,
To unmask falsehood, and bring truth to light."
The Rape of Lucrece, l. 930. Shakespeare.

" Oh, happy he who can still hope to emerge from this sea of error ! What one does not know is exactly what one should want to know, and what one knows is what one has no use for."

Goethe.

" A man protesting against error is on the way towards uniting himself with all men that believe in truth."

Carlyle.

" The history of errors, properly managed, often shortens the road to truth."

Sir Joshua Reynolds.

" A common error is the greater and more mischievous for being so common."

Clarendon.

" By the communication of general and popular Science, Vulgar Errors and Common Prejudices are constantly diminished."

Sir Humphry Davy.

" To which *Calendar* of doubts or problems, I advise be annexed another *Calendar*, as much or more material, which is a *Calendar of Popular Errors* : I mean chiefly of natural history, such as pass in speech and conceit, and are, nevertheless, apparently detected and convicted of untruth ; that Man's knowledge be not weakened nor imbased by such dross and vanity."—p. 153, *Advancement of Learning* (1605), Sir Francis Bacon.

" The narrower the range of man's knowledge of physical causes, the wider is the field which he has to fill up with hypothetical causes of a metaphysical or supernatural character."—Vol. I., p. 88, *Myth, Ritual, and Religion.* Andrew Lang.

" It can never be required that we should assent to those things, the existence whereof is neither manifest to the senses, nor the explanation of them probable by reason."—*Condensation and Rarification in Natural Bodies* (p. 294). Sir Francis Bacon.

" I have always preferred to offend by Truth than to please by Flattery."

Seneca.

" A substantial and severe collection of the heteroclites or irregulars of Nature, well examined and described, I find not : especially not with due rejection of fables and popular errors : for as things now are, if an untruth in Nature be once on foot, what by reason of the neglect of

examination, and countenance of antiquity, and what by reason of the use of the opinion in similitudes and ornaments of speech, it is never called down."—Bacon, *The Advancement of Learning*, p. 105.

" In matters far removed from ordinary life and experience, pure ignorance is possible, perhaps ; and, in comparison, little mischievous. But in those which concern us all and at all times, it is alike impossible to be purely ignorant and to be ignorant with impunity."
W. B. Hodgson, LL.D., at p. 194 of *Science and Education*.

" We must consider the causes of so great a misfortune, and so long and general a unanimity in error, that we may thus render the access to truth less difficult, and that the human Understanding may the more readily be purified and brought to dismiss its *Idols*."
Bacon, *Novum Organum*, p. 30.

" Our best plan therefore is to expose these errors."
Bacon, *Novum Organum*, p. 76.

" This news which is called true is so like an old tale that the verity of it is in strong suspicion."—*Winter's Tale*, V., ii., 28.

" What wretched errors hath my heart committed,
Whilst it hath thought itself so blessed never ! "
Shakespeare's *Sonnets*, CXIX., ll. 5 and 6.

" And mountainous error be too highly heep'd
For truth to o'er-peer."
Coriolanus, II. iii., 117.

" It is not calumny or treachery that do the largest sum of mischief in the world. But it is the glistening and softly spoken lie ; the amiable fallacy ; the patriotic lie of the historian, the provident lie of the politician, the zealous lie of the partisan, the merciful lie of the friend, and the careless lie of each man to himself, that cast black mystery over humanity, through which we thank any man who pierces, as we would thank one who dug a well in a desert."
John Ruskin in *The Seven Lamps of Architecture*.

" A lie gets half way round the world before Truth has got her boots on."
Spurgeon.

" Conquest over superstition that hath ruled and ruined long."
W. H. Kernan.

" Might we not, in passing, contrast this exalted superstition with the grovelling delusions which have taken hold of the fantasy of our day ? Were the character which superstition assumes in different ages an indication of man's advance or retrogression, assuredly the nineteenth century would have no reason to plume itself, in comparison with the sixth B.C."—John Tyndall, F.R.S., at p. 402 of *On Sound*.

" Errors like straws upon the surface flow ;
He who would search for pearls must dive below."
Dryden, *All For Love*, Prologue.

" To free a man from error is to give, not take away."
Schopenhauer.

" Nothing is more harmful to a new truth than an old error."
Goethe.

" Irrationally held truths may be more harmful than reasoned errors."
Huxley.

" They defend their errors as if they were defending their inheritance."
Burke.

" Remote from liberty and truth ;
By fortune's crime, my early youth
Drank error's poisoned springs."
Earl Nugent.

" When the learned man errs he errs with a learned error."
Arabic.

" No one commits error alone for himself, but scatters his folly among those near him."
Seneca.

" The same high mental faculties which first led men to believe in unseen spiritual agencies, then in fetishism, polytheism, and ultimately in monotheism, would infallibly lead him, as long as his reasoning powers remained poorly developed, to various strange superstitions and customs. Many of these are terrible to think of—such as the sacrifice of human beings to a blood-loving god ; the trial of innocent persons by the ordeal of poison or fire ; witchcraft, etc.—yet it is well occasionally to reflect on these superstitions, for they show us what an infinite debt of gratitude we owe to the improvement of our reason, to science, and to our accumulated knowledge."
Chas. Darwin, *Descent of Man* (1901), p. 146.

" It is the nature of man to err, of a fool to persevere in error."
Proverb.

" Error is a hardy plant ; it flourishes in every soil."—M. F. Tupper.

" Truth lies within a little and
Certain compass, but error is immense."
Bolingbroke.

" Man is the child of error."—*Arabic.*

" O hateful error, melancholy's child !
Why dost thou show to the apt thoughts of men,
The things that are not ? "
Julius Cæsar, V., 3.

" Those are wise who through error press on to truth ; those are fools who hold fast by error."
Rückert.

" Error is always more busy than ignorance. Ignorance is a blank sheet on which we may write, but error is a scribbled one from which we must first erase."

Colton.

" Error is always talkative."

Goldsmith.

" Error is created ; truth is eternal."

Wm. Blake.

" Error is worse than ignorance."

Bailey.

" Error never leaves us, yet a higher need always draws the striving spirit gently on to truth."

Goethe.

" Stammered and stumbled, and the wrong parts played,
And life a Tragedy of Errors made."

William Watson.

" It is one thing to show a man that he is in error, and another to put him in possession of truth."

John Locke.

POPULAR FALLACIES

DOMESTIC FALLACIES

(a) GENERAL

That a Thaw Bursts the Water Pipes

WHAT occurs is: The pipes are burst by the expansion of the water as it congeals into ice, and as long as it remains ice there are no unpleasant consequences (except that no water can pass through the pipe); but when the thaw takes place the ice melts, and the water pours out of the rent in the pipe, which may have been made days before.

The expansion due to the freezing of water is easily illustrated by placing a tin brimful of water on an outside window-sill on a calm frosty night. In the morning the ice will be found projecting above the rim.

If during the next long and hard frost you will take the trouble to examine the water-pipes that are frozen, you will find some of them burst, or at least swollen (if lead), and the next frost may burst them. Should you be successful in your search, the turning off of the cocks on the cistern, or at the main, will somewhat mitigate the unhappy lot of paterfamilias when the thaw does take place.

An American invented a water pipe with a series of small air vessels on it, so that if the water in it became frozen, the expansion of the ice would take place into these air spaces. Mr. H. Powell told the author that about the year 1890, all water pipes belonging to the municipality of Rouen were oval in cross section, so that if the water in them became frozen, the expansion would merely make the pipes more nearly circular.

That a Poker Resting on the Top Bar of a Grate and Pointing Up the Chimney Draws Up the Fire

For the poker to increase the draught, or cause a draught, it would have to be hotter than the gases which surround it, in which case the gases in the immediate neighbourhood of the poker would become less dense, and hence rise; but the poker can never be hotter than the surrounding gases, though it may *feel* so, because it is a better conductor of

heat than the gases (*vide* "Woollen Articles"), for it is due to them and the radiation from a feeble fire that its temperature is higher than that of the room. On the other hand, placing the cold poker in the gases would cool them, and tend to produce a down draught by a reversal of the process explained above, until it attained the same temperature as the gases, when, from a temperature point of view, it would have no effect. It would, however, still hinder the draught to a slight extent, for consider a number of pokers so arranged; they would materially reduce the area of the flue, much in the same way as nearly closing the register, which, of course, reduces the draught.

Putting the poker *in* the fire, and then lowering the handle so as to raise up some of the coal and form an inlet for fresh air, which contains the oxygen necessary for the combustion of the fuel, is quite a different thing, and does assist to "draw up the fire"; and, with this object in view, some ingenious person has made a hollow poker, which, no doubt, on being placed in a fire, supplies the inner portions of it with a small quantity of fresh air.

Some try to justify the practice of resting the poker on the top bar of the grate by saying that holding a newspaper over the top portion of the fire-place also draws the fire up. But the principles involved in the two cases are quite different. In the latter all the air is compelled to pass through the fire *viâ* the ash-pit and front fire-bars, and none of it merely passes over the fire and thence up the chimney. Some fire-places are constructed with iron doors which can be closed so as to act like a newspaper placed as described.

This fallacy may have arisen by confusion with the well-known experiment of burning a bit of candle in a lamp-glass. The candle is placed upright in a little dish of water (to make an air-tight joint), and the lamp-glass is placed vertically over it. In a short time the candle goes out, or burns very feebly, owing to the lack of oxygen. A current of hot air tries to escape at the top, but it is prevented from so doing by an equal volume of cold air trying to get in and take its place. But if a piece of cardboard, cut into the form of a broad T, be placed in the top of the chimney so as to divide it into two vertical channels, then an up-current will start on one side of the cardboard, and a down-current on the other, and the candle will burn brightly.

It has been said that the poker forms a cross with the top bar of the grate, and this keeps the Devil away; but one would have thought that the Prince of Fire would have helped matters, and therefore to keep him away seems a mistake!

There is no such action as the attracting of the flue gases up the chimney after the manner of a magnet attracting pieces of iron, and we would suggest to those who believe in and practise the "poker trick" that they should attend to and make up the fire in the same careful manner as they do before putting the poker in the fascinating position, and then *not* so place the poker. Or, again, try putting the poker in position without making up the fire, and see then whether it will draw the fire up!

Herbert Spencer said that a person who believed in this alleged action of a poker had no quantitative or qualitative idea of physical causation!

That a Thick Tumbler Stands Hot Water Better than a Thin One*

Glass is a bad conductor of heat, and when hot water is poured into a thick glass tumbler the inner layers of the glass are soon at a much higher temperature than the outer. The higher temperature causes a greater expansion, and hence the outer layers are burst by the expansion of the inner ones. In the case of a thin tumbler, or chemist's glass beaker, the whole thickness of the glass is raised to practically the same temperature almost at once, and consequently all the parts expand equally at once, and no excessive stresses are produced.

The above actions are more marked if we try to warm a thick glass tumblerful of water over a gas jet, for then the difference of temperature between the inside and outside layers is very great, and it is almost certain to break the glass; but a thinner tumbler—or, better still, a glass beaker—will not be harmed in the least.

This fallacy has arisen by our thinking (when comparing the glasses) of the comparative forces, or of the blows that would be required to break the tumblers; for by this test, of course, the thick tumbler would be the stronger, provided it had no initial internal stresses due to bad annealing.

* See *Elementary Lessons in Logic*, by Stanley Jevons, M.A., F.R.S., p. 257.

Such internal stresses are well illustrated in Prince Rupert's drops, which fly into innumerable pieces as soon as the small end is broken.

That Moths Eat Clothes

This fallacy is somewhat akin to the one that a thaw bursts the water-pipes, for when a thaw comes, then also comes the inconvenience of burst water-pipes. Similarly, when the clothes are taken out and found moth-eaten, and moths fly from them, the too-ready conclusion is that the moths have eaten them. What occurs is this: The clothes-moths lay eggs on suitable materials, these eggs develop into larvæ or grubs, which eat the clothes. The larvæ then change into pupæ, each forming a tiny cocoon (similar to that of a silk-worm) for itself, and after some time the cycle of changes is completed by moths emerging from these cocoons, which may be found among clothes that have been badly moth-eaten. So we see that the moths which fly out on the clothes being disturbed are quite innocent of the harm that has been done up to that time; but if left, they will of course lay eggs, and the resulting larvæ will start operations at once.

An entomological friend told us a very amusing experience of his illustrating this fallacy. He gets his friends to collect moths and butterflies for him, and on calling one day at the house of a fair collector, she showed him a very fine living specimen of the Emperor-moth (*Saturnia pavonia minor*), which she had caught for him. Not knowing how to kill it, she had kept it alive for several days, and, moreover, out of the kindness of her gentle heart, she had fed it. On being asked what she had fed it on, she replied ingenuously, "Oh, I gave it a bit of old rag to eat!"

Some moths do not eat anything, as they have a sufficient store of nutriment to enable them to fulfil their mission in life, after which they die young! Others sip the nectar from flowers, and it is the flowers which open at night that are most strongly scented for the purpose of attracting the moths by their sense of smell, that of sight being useless in the dark.

That Cats Suck the Breath out of Sleeping Children

We are very sorry that this serious charge is brought against poor puss, one of the cleanest of animals, from which many human beings even might take a lesson.

Well, let us explain, and, we trust, soften the hearts of her accusers. The cat, liking a warm, clean place, finds this in a child's cot, and if the cot be narrow, so that there is no room for puss to nestle alongside the child, occasionally she takes up her position on the baby, and her mouth may by a still less chance happen to be near the child's mouth. Now consider for a moment the ratio of the weight of the cat* to that of the child ; it is considerable, and if we imagine a proportionate weight on our own chest, we shall begin to realise that it is a serious matter. Again, if the mouths of the baby and the cat are near one another, the child is probably not breathing air as fresh as it might be.

Lastly, the formation of the cat's mouth makes it impossible for it to interrupt respiration by the mouth and the nose of the child at the same time. Hence we see that while it is by no means desirable to let a cat sleep on top of a child, when this does occur it is not from any malice prepense on the part of puss.

We have only two records† of children having been thus killed, though we have statistics of thousands of cases of children being overlaid by their drunken parents, and the infantile mortality from this cause is markedly higher on Saturday and Sunday nights, when drunkenness is more frequent.

That the Sun when shining upon a Fire in a Grate puts it out

"*One fire drives out one fire.*"—Shakespeare, Coriolanus, IV., s. vii., l. 54.

"*One fire burns out another's burning.*"—Romeo and Juliet, I., ii., 45.

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* The author's late tom cat weighed 13 lb. 11 oz., while the following are the average weights of babies : one month old, 8 lb. ; four, 12½ lb. ; eight, 18 lb. ; twelve, 22 lb.

†Suffocated by a Cat.—An infant was suffocated in Birmingham on Wednesday night under strange circumstances. Soon after it was put to bed, a cat belonging to the premises jumped on the bed and settled down on the baby's face. When the cat was turned off the child was found to be dead.—*Daily Mail*, April 7, 1899.

" A baby girl aged five months, the daughter of Joseph Duncan, a mine-sweeper, of Aberdeen, was found dead in her crib yesterday with a cat laying across her face and mouth. The cat had jumped into the crib during the absence of Mrs. Duncan."—*Ibid*, April 23, 1915.

"Where two raging fires meet together,
They do consume the thing that feeds their fury."
Taming of the Shrew, II., 1.

"Even as one heat another heat expels."—Two Gentlemen of Verona, II., iv., 190.

John Timbs, in his *Popular Errors*, quotes some experiments of Dr. M'Keever that tend to show the above is not a fallacy, as the ratio of the rate of burning in sunshine to the rate of burning in a dark room was found to be as ten to eleven. The author does not consider these experiments satisfactory, for the result appears to have been obtained from a single experiment, and that was the burning of only one inch of a common candle. Besides, in the dark room there were probably hardly any air currents, whereas in the sunshine there may have been a considerable draught, and while a draught makes a candle "gutter," the actual consumption of wax is less, for the temperature of the flame is reduced by the wind, and we all know how small a candle flame becomes in a strong draught.

The experiment of Dr. M'Keever has been repeated by Prof. Le Conte, of the United States, who has found the rate of combustion to be sensibly the same in the dark and in the sunshine; yet it varies from day to day, according to the density of the air. For details, see Well's *Annual of Scientific Discovery* for 1858, pp. 198-203.

Now let us see what can be said for or against the above idea. If it be a bright sunny day, whether in the autumn or winter, one does not feel so cold as on a day (of the same temperature) which is damp and dull; consequently the fire does not receive the assiduous attention it does on the dull, damp day, and it expresses its feelings, caused by this neglect, by going out (not to the club) or getting very low (spirited). Again—for the same reason that we cannot see the stars or planets by daylight—the contrast between the fire-light and the bright sunlight is not so great as between the fire-light and the dim light of the dull day; hence the fire *appears* to be burning less brightly when the sunlight is on it than it really is; and if you will take the trouble to pull down the blinds so as to darken the room, you will find the fire appears brighter *at once*. It could not have "burnt up" in the minute it took you to let the blinds down. Furthermore, when a piece of coal gradually burns, it becomes coated with a layer of ash. Now when the room

is dark we see the glowing coal shining through this ash, but if the sun's bright light shines upon the outside of this ash, we see the ash by "reflected light," (whereas before we saw it by transmitted light), and the glowing coal within is scarcely visible.

Thus far our arguments are in favour of it not making any difference in the rate of combustion whether the sun be shining upon the fire or not. The only effect that may tend slightly to reduce the rate of combustion is that the heat of the sun would slightly rarefy the air in the neighbourhood of the fire, and then there would not be the same amount of oxygen per cubic foot of air passing through the fire. Be this as it may, Tyndall and Frankland made the experiment of burning candles in a valley (where the air is dense), and then on top of a high mountain (where the air was rarefied), and they found that the same weight of candle was burnt in the same time in either place, but that the light emitted was greater when the candles were burnt in the valley.

It is well known that coal may be ignited by the sun's rays when these are concentrated by a large lens. If it were true that the unconcentrated rays put a fire out, there would be some intermediate point where these reverse effects change —where is it ?

The following simple experiments are convincing :—

Smoke a cigarette in a dark room, have a little ash on it, and note the glow. Then light a match and hold it close to the lighted end of the cigarette. The latter will appear to have nearly gone out. Blow out the match and the cigarette will appear to have brightened up again. Repeat the experiment.

On a bright sunny day stand in the shadow of say the trunk of a tree and smoke a cigarette. Note the glow. Then hold the cigarette so that the direct sunlight falls on it. It will appear to have gone out.

That the Sun shining into a Room raises the Dust

It is impossible with the naked eye to see dust by ordinary light—or diffused light, as the correct term is—but when the particles of dust are highly illuminated, as by a beam of sunlight coming into the room, or by the powerful rays of the electric search-light, they are visible ; but they were there just as much the moment before the beam

passed that way. In fact, the error has risen on the principle, " Out of sight, out of mind." If the atmosphere were perfectly free from dust we should not see the characteristic beam from the searchlights, or the sunbeams as they are so often depicted in views of the interiors of churches. Indeed, the diffusion of light would be greatly reduced.*

That the Blackening of Ceilings over a Gas Light, or Lamp, is entirely due to the Carbon (Soot) in the Gas or Oil

Dr. H. E. Armstrong, F.R.S., says it is the current of air (induced by the flame) which causes the particles of dust in the air to impinge on the ceiling and stick there, and that a small fan, producing a current of air, would have a similar effect. This statement is certainly borne out by the fact that a crack in a door, or wooden partition through which a current of air passes, always gets very black and dirty. Of course, if you deliberately make the gas smoke, it will supply so many more particles of dirt (in this case carbon) to stick on the ceiling. This blackening effect may be seen over hot-water pipes and radiators.

That the Pendulum Works the Clock

If this be so, why do we wind up the clock and not the pendulum ?

If you hang a weight on the end of a piece of string, the other end of which is fixed to a support, you have a rough pendulum ; but surely no one thinks that this would go on oscillating for an indefinite time ? What occurs is that the resistance of the air and the slight inflexibility of the string ultimately bring this pendulum to rest. If we wish to keep it continually oscillating we must periodically give it a small impulse, and this is done in a clock by the mainspring actuating, through the train of wheels, the escapement pallets and the fork of the crutch. The crutch is a light rod attached to the pallets, which reaches down the pendulum for some distance and is then twisted loosely round it. Every time the pendulum moves to the right or left, it receives a slight impulse from this rod.

If the normal period of vibration of the pendulum is not to be altered, this impulse must be given at the middle

* *Vide*, " That the blue sky does not exist when it is a very dull day.

of each swing—*i.e.* when the pendulum is just in the vertical position of its swing.

The use of the pendulum is to govern the clock, and it does so because all pendulums have perfectly definite periods of vibration which for a given place on the Earth depend only on the length of the pendulum, the shorter ones vibrating more quickly than the longer ones.

That it is Impossible to Get a Fruit Stain out of a Cloth until the Fruit is out of Season

This mistake may have arisen because a long time is required to get some stains out by the ordinary process of washing—so long, in fact (a table-cloth or serviette usually being washed once a fortnight, as one week is spent at the wash)—that the fruit may happen to be out of season by the time this has occurred ; but we must not say, " Therefore it is impossible to get the stain out while the fruit is in season." If the mere fact of the fruit being in season prevented its stains being got out, then we could argue that the stains of some fruits should never come out, for some fruits are always " in season " in one part of the world or another. Again, if it depended on the fruit going out of season, then those stains which were made late in the season should come out at the same time as those which were made in the early part of the season ; that is, directly the fruit goes out of season !

For the sake of those who may still be sceptical we made the following experiment :—An old linen handkerchief was deeply stained all over by having a number of blackberries crushed and rubbed into it. It was then allowed to dry, and three days after the staining it was torn into several portions, one of which was then washed with " Sunlight soap " and cold water, and put in the sun to bleach. This was repeated four times at intervals of a few days, thus being equivalent to eight weeks of ordinary washing (*vide supra*), and yet the staining was by no means entirely removed (but you see the fruit was in season still !) Another portion after having dried for a week was treated with strong acetic acid for some hours, and then washed in plain water. This scarcely removed any of the staining. Another portion was wetted and submitted to the fumes of burning sulphur (which, with the moisture, would form sulphurous acid).

This very nearly removed all the stains, and might have done so completely had the staining been of the ordinary nature.

Lastly, one of the original portions, which had been left dry for a fortnight, was wetted, powdered oxalic acid ("salts of lemon") sprinkled on it, and the fabric rolled up and kept moist for some twenty-four hours. It was then washed in plain water, and the same treatment repeated once, by which time the stains were completely removed, the fruit being still in season!

We have given the unsuccessful experiments to illustrate how easily one who believes in this fallacy might confirm an erroneous belief; for the first three trials failing to remove the stain, one would be almost certain to conclude that they could not be obliterated till the fruit was out of season. On the other hand, the author feeling sure that the common statement was incorrect, was determined to find something that would remove the stain while the fruit was in season.

Oxalic acid, which successfully removed the deep blackberry stains in the foregoing experiment, is also useful in the case of ink-stains or iron-moulds; but perhaps the most successful treatment for an ink-stain is the application of milk if it is put on at once. Should ink be spilled on a carpet remove as much of the ink as possible by means of a spoon or blotting paper. Then saturate the spot thoroughly with milk, using perhaps a pint of it. After some time, remove the milk by the use of plenty of blotting paper, standing on it to squeeze the fluid into the paper. Then rub the carpet with a clean cloth.

That Steam is Visible

What we see issuing from a safety-valve or a steam-cock on a boiler, or from the spout of a kettle, is *condensed* steam, which consists of an innumerable number of tiny globules of water, and thus is exactly similar to a cloud in the sky. Experimental boilers are occasionally made with plates of glass in places, so that we may "see" the invisible steam, for steam is as invisible as the air. When steam is rapidly issuing from a cock on a steam boiler, there is nothing visible close to the cock; but as we look farther and farther away from the tap, the white condensed steam becomes more visible. This phenomenon occurs to a slight extent even with an ordinary kettle when it is boiling very fast.

That the so-called "Tin" Utensils are Made Entirely of the Metal Tin

Tin-plate is iron or mild-steel plate which has been chemically cleaned, and then dipped into a bath of molten tin, withdrawn, and allowed to cool.

When a piece of new tin-plate is cut with shears, we cannot distinguish between the colour of the iron and the outer layers of tin at the cut edge, and this is misleading; but when a piece of tin-plate rusts, we see the brown-red iron-rust breaking through the layer of tin in small patches. Tin itself oxydises only slightly, the oxide being white.

That certain Gas and Oil Heating Stoves "Consume their own Smoke"

By "smoke," we take it, is meant "products of combustion," for such heating stoves are not, as a rule, intentionally allowed to produce visible smoke.

Whether the fuel be coal-gas or oil, the products of combustion are carbon dioxide, water-vapour, and traces of other substances. The carbon dioxide is the chief product which must be got rid of, and no amount of reburning by mixing it with fresh air supplied to the flame will convert it into anything else but carbon dioxide.

There are several contrivances for rapidly heating water in a bath-room, which consist principally of a narrow space through which the water passes, and a large number of gas jets to heat it. The apparatus is usually placed over the foot of the bath, and some two feet above it. Bath-rooms are not usually large, and in winter when the heater is most used the window is closed. Consequently, if the heater is not provided with a proper chimney, the percentage of carbon dioxide in the air of the bath-room is raised enormously.

The apparatus being just over the bath, and the carbon dioxide being heavier than air, it tends to collect in the bath; hence it is that several deaths have occurred where these heaters have been used without proper chimneys. An account of one such death (and nearly a second) which occurred at Kirkgate Station, Wakefield, appeared in the *Daily Mail* of October 14, 1902.

Two more cases were reported as follows:—

"Fumes from the geyser used to heat the water were stated, at an inquest yesterday, to have caused the death of

Robert James Bennett, of Bolton, while taking a bath at a friend's house at Sheffield."—*Daily Mail*, Sept. 29, 1909.

" Suffocated by the fumes from a bath geyser, which was out of order, Charles Marks, aged thirty, was yesterday found dead in his bathroom at Chatham."—*Daily Mail*, Oct. 4, 1909.

Sometimes an ignorant or unscrupulous salesman of gas-stoves will say that his stoves condense all the products of combustion, and in " proof " of his statement he will call attention to a tray with some water in it underneath the stove. This argument is particularly popular with that form of stove which has a luminous flame and two vertical bright copper tubes, one at each side of the stove. The water in the tray is partly the condensed water-vapour produced by combustion, but it contains only a trace of the carbon dioxide. Chimneyless, syphonic or condensing gas-stoves were dealt with in the report (December, 1906) of the Coal Smoke Abatement Society on their tests of twenty-five gas-stoves. While the carbon dioxide in the atmosphere during the tests was about 5 parts in 10,000, and in the air of the rooms heated by gas-stoves *with* chimneys about 6·6 parts per 10,000, there were no fewer than 19 parts per 10,000 in the case of the gas-stoves of the condenser or syphon type (which are not provided with chimneys). But even this quantity is perfectly innocuous.

A worse danger than that due to the carbon dioxide is the formation of carbon monoxide gas. This gas is highly poisonous, and is formed when the supply of air to the stove is too limited.

The following abridged report from the *Daily Mail* of Christmas Day (above all others !), 1909, is a terrible confirmation of the foregoing facts :—

" Coroner's Three Inquests.

" Stove Danger.

" Three Deaths from Poisonous Gases.

" An inquiry was conducted by Mr. Troutbeck at Westminster Coroner's Court yesterday into the death of Mervyn Edward Archdale, aged nineteen, which occurred at 37, Grosvenor Square, W., from the effects of poisoning by fumes from a charcoal-stove.

" Mrs. Lawson, wife of the Hon. Harry Lawson, of 37, Grosvenor Square, said Mr. Archdale was her nephew, and

when in town resided with her. She last saw him alive on Wednesday evening, and she had just returned from St. George's-in-the-East when she was informed that her nephew was missing. A thorough search of the house was made, and eventually a lavatory door was burst open, Mr. Archdale being found within. The window was closed.

" Dr. R. Salusbury Trevor, pathologist at St. George's Hospital, who conducted the autopsy, stated that death was due to poisoning by carbon dioxide and carbon monoxide.

" The Coroner : Water being used in connection with this stove, using charcoal, would it have any effect in removing the poisonous fumes ?

" The witness : I do not think so, under ordinary circumstances. If the fumes could have been passed through the water it might have had some effect, but the water on top would have practically no effect beyond making the air a little damp. Carbon dioxide would make a person drowsy, and, by falling, he would get into the zone of the other more poisonous gas.

" The Coroner : No doubt the deceased gentleman came by his death owing to the presence of the stove ?—Undoubtedly.

" Dr. Harry E. Bruce Bruce-Porter, of Grosvenor Street, W., agreed that the effects of the poisonous gases would be to stupefy, and a person suffering from them would remain in that state until he died. The result of the post-mortem examination was perfectly consistent with what happened."

" Office Mystery Solved.

" Professor Wilson, lecturer on hygiene in Queen's College, Belfast, gave evidence yesterday at an inquest held by the coroner in that city regarding the grave risks attending the use of gas stoves for heating purposes.

" Mr. John Leeburn was found dead in his office when his workmen arrived on Thursday morning, and Miss Annie Adair was sitting in a chair in the same room unconscious. A gas stove was burning and the room was suffocatingly warm. The stove had a chimney, but it was not carried out of the room.

" Professor Wilson said that death was caused by carbonic oxide gas poisoning. The provision of gas stoves in small rooms without ventilation or means of carrying off the fumes

was most dangerous, and the popular practice of placing a bowl of water in front of the stove was useless for the purpose of counteracting the danger, the gas being insoluble in water. In this case there had probably been imperfect combustion."

"Sleeping to Death.

"The death of a domestic servant, Margaret Ellen Rumsby, twenty-four, employed at the residence of Dr. G. P. L. Mummery, in Cavendish Place, W., from the fumes of a stove in her bedroom was investigated yesterday by the Marylebone coroner, Dr. W. Schroder.

"Dr. Mummery said he bought the stove because it was recommended on account of its fuel, a patent kind which he was told did not give off fumes. He instructed the girl to use the stove only during the day, and to put it into the passage at night, and Mrs. Mummery spoke to her on the same subject on Sunday. She died during Monday night ; she had kept the stove in her room, and the door and window were closed.

"Dr. P. B. Spurgeon said death was due to asphyxia from carbon monoxide poisoning. She simply slept herself to death as a result of the fumes.

"Further evidence showed that this description of stove is being manufactured at Derby by a firm which has sold 14,000 of them to suit a special fuel, supposed to be compressed peat, obtained from Germany. The stove, it was stated, is recommended only for well-ventilated places.

"The jury found a verdict of Death from Misadventure, and added that no stove should be used without a metallic pipe rigidly fixed."

That Plenty of Space Does Away with the Necessity for Ventilation

There should be 1,000 cubic feet of space for each individual in a room, and, in addition to this, 3,000 cubic feet of fresh air should be introduced into the room per hour for each person. For example, if the room be 10 ft. long, 10 ft. wide and 10 ft. high, it contains the right number of cubic feet of air for one person ; but it is wrong for him or her to sit or sleep in that room if every door, window, or crevice where fresh air might get in is closed up, and luted with india-rubber, felt, sandbags, &c. ; for 3,000 cubic feet of fresh air should be passing into the room per hour, and, of course, a

corresponding quantity of foul air should be passing out through the chimney or the ventilator. If the room be 20 ft. long, 10 ft. wide and 10 ft. high, then it is suitable for occupation by two persons, if 6,000 cubic feet of fresh air be passed in per hour.

If the cubic space per individual be less than 1,000 cubic feet, then it is even more necessary to have thorough ventilation ; but if the air of a room be changed more than four or five times per hour, a draught will probably be felt.

It is found in practice that in ordinary dwelling-houses, the useful height of a room—from a sanitary point of view—is limited to 12 ft. Anything above that must be excluded when calculating for what number of persons the room is suitable.

That in House Drainage Perfect Safety is Afforded by a Trap

" That erroneous belief : among the public and ignorant workmen, that perfect safety is afforded by a trap, is responsible for many grave defects in house drainage." Dr. George Reid, D.P.H., in his *Practical Sanitation.*

Traps are certainly necessary in connection with the sanitary fittings of a house, but they must be put in the right places, otherwise they may do more harm than good. The author in his practice has found a trap at the foot of a soil-pipe, where it joined the drain. The drain was properly connected to a fresh air inlet, but this trap made this inlet useless, and stopped the ventilation of the drain as well as of the soil-pipe. Even well-designed sanitary arrangements often get leaky at the joints, and, consequently, sanitary surveys should be made from time to time.

That Green Wall-paper is the Only Kind that is Likely to be Dangerous on account of it possibly containing Arsenic

" It is popularly supposed," says Dr. George Reid, D.P.H., " that green is the only dangerous colour, and that the sole precaution necessary is to avoid it ; this is an absolute fallacy, for other coloured papers may contain arsenic.

" The medical dose of arsenic varies from 1/62 to 1/12 of a grain, and when one considers that wall-papers have been found to contain as much as 17 grains per square foot, the gravity of the question becomes apparent."

Dr. E. Lankester, M.D., F.R.S., in *The Uses of Animals to Man*, refers to the danger of green flock-papers, arsenite

of copper being used in their manufacture. He says instances have not been rare of persons living in rooms where these green flock-papers have been used, with the result that when the paper has been brushed, the particles of arsenite of copper have been taken into the lungs, and produced injurious effects on the system.

That the Terms "Disinfect" and "Antiseptic" are Synonyms

A disinfectant is a substance which, on coming in contact with the micro-organisms that produce disease, absolutely destroys them; whereas an antiseptic is a substance which, in similar circumstances, would merely hinder the increase of the micro-organisms, and not actually destroy them. A still weaker substance (such as permanganate of potassium) would simply act as a "deodorant," by oxidising some or all of the organic matter with which it came in contact.

Lastly, substances like the vapours of turpentine, burning peat, boiling tar, eucalyptus, charcoal, or camphor, merely mask the unpleasant smell, and are thus likely to be dangerous.

Solutions of corrosive sublimate (bichloride of mercury), 1 part in 1,000 parts of water, carbolic acid (phenol.), 1 part in 20, and a few proprietary preparations, such as "Izal," "Cyllin," and "Chloros," are the only practical chemical disinfectants.

That warming a room by a Gas-stove makes the air unusually dry

The author was partly responsible for the methods adopted by the Coal Smoke Abatement Society for testing a large number of coal-fire grates and gas-stoves in the Ministry of Health offices in Whitehall. The results of these tests were published in the *Lancet* of May 19 and Nov. 17, 1906, and on reference to these it will be seen that while the mean humidity (*i.e.*, the ratio of the quantity of aqueous vapour actually in the air to that which it would contain if it were saturated) of the air in the unwarmed corridors—which were freely open to the external air, as the building was in course of construction—was 84·3 per cent., the mean humidity of the air in the rooms when they were heated by gas-stoves was 81·9 per cent. This naturally shows some drying effect, but it is inconsiderable, for it is pretty well known among warming and ventilating engineers

that a humidity of 75 per cent. (which is much drier) is considered pleasant.

That Coalite is the same thing as coke

Coalite is a patent smokeless fuel obtained by the distillation at a comparatively low temperature of ordinary coal, while coke is the residuum after coal has been distilled at a much higher temperature. The "stills," or retorts, in which the respective distillations are carried out are quite different.

The following is an extract from the Presidential address of Prof. Henry Adams, M.I.C.E., F.R.S.I., to the Institute of Sanitary Engineers on Jan. 20, 1908 :—

"In this connection it may not be inappropriate to call attention to the new fuel, 'Coalite.' This is manufactured from any caking bituminous coal, the process consisting in carbonising such coals for a period of eight hours in flat, rectangular retorts, 10 ft. in length, which are placed vertically in a gas-fired furnace, the temperature of which is kept at 800 degrees Fahr., a temperature which just shows a dull red glow when shaded from strong light. These retorts being filled, the swelling of the coal on heating causes a considerable pressure, and results in the formation of a product of good density, whilst the low temperature prevents the whole of the volatile matter being expelled, and yields a substance which, although it has a superficial resemblance to ordinary coke, differs widely from it in many important points. Each retort takes 15 cwts. of coal at a charge, and yields, approximately, 11 cwts. of 'Coalite,' but this varies with the composition of the coal used, so that, although in most cases the yield is 70 per cent. of the coal taken, it may be slightly higher or lower. It is stated on good authority that this new form of coke lights readily and burns vigorously, but absolutely without smoke. The by-products of the manufacture are valuable, and help to reduce the cost of the fuel to the householder. The Coal Smoke Abatement Society are entirely in favour of it. MM. Rickett, Cockerell & Co. state that the output of the existing works for the manufacture of this material is fully booked for some months ahead, and that the British Coalite Company have been reluctantly compelled to refuse any further orders until the new works which are being erected with all possible speed are in operation."

That it is Possible to Disinfect the Air

Our Wimpole Street physician says this is an exploded idea, and MM. Notter and Firth (Surgeon-Colonel J. Lane Notter, M.A., M.D., R.A.M.C., and Surgeon-Colonel R. H. Firth, F.R.C.S., R.A.M.C.), in their well-known *Hygiene* (p. 297), say :—" Far too great importance is attached by people to fumigation, and to the influence of chemical vapours as purifiers and means of disinfecting the air. The truth is, aerial disinfection is more or less of a delusion unless the air be rendered unfit to breathe. We should not aim at purifying old or fouled air, but rather at renewing it by free dilution and ventilation."

Under " Disinfection " in Quain's *Dictionary of Medicine*, we find, " Infected air should be removed by ventilation : it is futile to sterilise it by gaseous disinfection, since to be effective these must be present in quantities incompatible with the existence of human beings. From this it follows that saucers of disinfecting fluids, or irritating vapours and gases in the sick room, are a useless annoyance to the patient, except in so far as they may be desired as deodorants."

That " Condy's Fluid " is a solution of permanganate of potash

The author wrote to Messrs. Condy and Mitchell, Limited, and received the following reply :—

" 65, Goswell Road, London.
" *August 10, 1909.*

" In reply to the inquiry contained in your favour of yesterday's date, we beg to inform you that Condy's Fluid contains *no* Permanganate of Potash, and this fact is stated on the labels affixed to all bottles containing our proprietary article, and the same statement is made in all our newspaper advertisements throughout the British Empire.

" We need hardly say that we are not responsible for erroneous statements made by unauthorised persons.—Yours faithfully,

" For Condy and Mitchell, Ltd.,
" (Signed) H. J. Bollmann Condy,
" *Managing Director.*"

On the leaflet accompanying the letter is the statement, " Condy's Fluid is non-poisonous, and is guaranteed to contain no Permanganate of Potash."

Prof. G. S. Newth, F.I.C., F.C.S., in writing, on Aug. 11,

1909, to the author on the subject, pointed out that a permanganate owes all its valuable properties, not to the metallic radical it contains, but to the acid radical, *i.e.*, to the fact that it is a salt of *permanganic acid*, a *permanganate*. As an oxidising (therefore disinfecting) agent it is quite immaterial whether the salt is permanganate of potassium, or permanganate of sodium, or permanganate of any other metal (provided the salt is soluble freely in water).

Permanganate of potash is sometimes spoken of as a poison, but while it is not an article of diet, it is somewhat harsh to speak of it as a poison. It is an antidote for poisoning by all forms of opium. As much as will lie on a three-penny-bit may be taken in a tumbler full of warm water, after as much as possible of the opium has been vomited.

That rooms warmed by gas-stoves are unhealthy

"Sir,—Perhaps I can relieve the evident anxiety of 'M.P.' in Tuesday's *Daily Mail*. *Gas as a heating agent I have found a great satisfaction and not in any way injurious to health*, but to fulfil those conditions it is essential to burn it in a suitable stove and one properly fitted up with an efficient flue for the products of combustion to escape. The stove should not be too powerful for the size of the room, and it should be capable of burning the gas efficiently even when only slightly turned on. Gas when thus burned is not more drying in the air than a similar amount of heat derived from coal. The room should be properly ventilated, but this applies to all rooms no matter how heated.
"4, Hertford Street, Mayfair. Alex Bowie, M.D."
Daily Mail, Oct. 16, 1905.

Dr. W. A. Bonney, speaking at Chelsea Town Hall on June 16, 1905, said, "Gas fires are not one atom less healthy than coal fires, and a hundred times more convenient. The heat in both cases is radiant heat. Everyone who is in any way delicate, especially on the chest, should have a gas fire in the bedroom—though the advice I am giving is against my own interest.'

The adoption of gas for heating by the medical profession during recent years doubtless owes its origin to a considerable extent to the report, based on exhaustive tests, made by a Special Analytical Sanitary Commission appointed by *The Lancet in* 1893. The following is an extract from that report,

which is an authoritative document prepared by recognised authorities on hygienic questions :—

" Most minute tests failed to find any deleterious products in the air of the room, in spite of the fact that no special precautions were taken to ensure ventilation. . . . Summing up the evidence gained from the entire results of the investigation, we are induced to express the opinion that gas can be used for warming purposes efficiently without prejudice to health and without the formation of fog-forming constituents or air-contaminating products. . . . "

This report has recently received full confirmation as the result of an investigation of the subject carried out by the Coal Smoke Abatement Society, with the assistance of the Office of Works. The investigation was conducted by two Physicians, assisted by chemical experts, and their report, published in *The Lancet* of Nov. 17, 1906, contains the following pronouncement :—

" Turning now to the conclusions which may be drawn from these tests they may be summed up in a few words as follows :—

" A properly constructed gas stove, with a flue sufficiently large to carry away the products of combustion, although for constant work more costly than a coal fire, is quite as satisfactory from a hygienic point of view, and does not in any way vitiate the air of the room, nor does it produce any abnormal drying effect as is popularly supposed. It will carry off from about 2,000 to 4,000 cubic feet of air per hour and this is a valuable ventilating effect. . . .

" They are also of the opinion that a properly constructed gas fire has the advantage of a coal fire from a hygienic point of view, owing to the more equable temperature and the absence of dust and smoke. . . . flue gases were analysed in several cases during the present tests, in no instance was carbon monoxide detected in the flue."

" To the Editor, *Journal of Gas Lighting*.

" Sir,—Some time last winter, a number of incandescent gas burners were installed in the rare and delicate birds' house at the Zoological Gardens ; and during the summer I visited Regent's Park and questioned the attendant who is in charge of these birds on the subject. The attendant informed me that the reason for introducing the lights into the house was that in the winter time there is so little day-

light in this country that the birds, previous to the introduction of the gas lights, did not eat sufficient food to 'keep body and soul together.' But since the fixing of the gas burners, there has been a great improvement in the health of the birds, and much less mortality among them.

"A few days ago I wrote to Mr. D. Seth-Smith, the Curator of Birds at the Zoological Gardens; and below I give a copy of his reply to my letter :—

"'ZOOLOGICAL GARDENS, REGENT'S PARK,
"'Nov. 27, 1909.

"'Douglas Helps, Esq., A.M.Inst.C.E.

"'DEAR SIR,— I am in receipt of your letter of the 26th inst., in reply to which I may state that we still use incandescent gas burners in our small birds' house. The light is turned on at 7 a.m., and the birds commence to feed at once. Again in the evening the gas is lighted for about two hours.

"'The digestion of some foreign birds is so rapid that they cannot go the whole of a long winter night in England without food; hence the value of the incandescent gas light to us. —Yours faithfully,

"'D. SETH-SMITH,
"'*Curator of Birds.*'

"The largest birds confined in this house are birds of paradise; and others are of the smallest and most delicate kind of foreign birds which it is possible to keep in captivity

. . . . .

"D. H. HELPS,
"Reading Gas Company. *Engineer and Manager.*"
"Dec. 2, 1909."

Dr. F. S. Toogood, Medical Superintendent of Lewisham Infirmary, has made many experiments on the subject and reported on them in the *Medical Magazine* for Feb., 1911. Among his conclusions were the following :—

"That a gas fire properly constructed and fixed, not only does not vitiate the air, but it is a valuable adjunct to the ventilation of the room. Its advantages in the sick room—in respect of its reliability, avoidance of noise, freedom from dust, producing propensities, and saving both of work and anxiety—are obvious to every professional man and woman.

That in large rooms adequately ventilated, flueless gas-stoves can be used for heating without any hygienic disadvantages. . . ."

That Camphor is a Disinfectant

The author remembers carrying (in accordance with the common practice at the time and place) a piece of camphor in a little perforated tin box in a waistcoat pocket during the small-pox epidemic at Cape Town about 1883. Another practice is to saturate a piece of brown-paper with spirits of camphor and then burn the paper in a sick room, as this is supposed to disinfect and "freshen the air." Drs. E. S. Reynolds, Alfred Russell, Notter and Firth all class camphor as merely a deodorant, while Dr. J. J. Ridge (*Medical Temperance Dictionary*, p. 31) states under "Camphor," "It has been recommended to carry some about on the person as an antiseptic to prevent infection, but it is useless for this purpose."

That the Traps on the Waste-pipe of a Kitchen or Scullery Sink is for catching grease

There are such things as grease-traps, and they are used in connection with kitchen or scullery sinks, but they are placed further from the sink then the trap we are considering, and are of an entirely different construction and for a different purpose. The sole use of the trap on the waste pipe is to prevent foul air from coming up the pipe and into the kitchen or scullery.

A grease trap is in the form of a gully taking the waste water from a kitchen or scullery sink waste pipe, and is for the purpose of collecting the grease so as to prevent it clogging the drain by congealing in it.

That a dark wrapper necessarily means a strong cigar, and a light wrapper a mild one. Also that the whiter the ash and the longer it stays on, the better the cigar

"Cigar Fallacies."

"The best of all my experiences in Havana has been to talk with the expert heads of the great factories and to find them poking a scornfully good-humoured finger through nearly all of the average smoker's most cherished theories. The average smoker believes that a dark wrapper means a strong cigar and a light wrapper a mild one; and he is absolutely wrong. There is no connection whatever between colour and strength. Squeezing cigars and smelling them are equally fallacious as tests of quality. So, too, is the colour and firm-

ness of the ash ; the notion that the whiter the ash and the longer it stays on the better the cigar is altogether erroneous. The best Havanas burn with a clear steel-grey ash, and its duration and length are mainly determined by the size of the pieces used in the fillers.

" Then, again, the men in Havana, heedless of the club reputations they are shattering, insist that a spotted cigar means less than nothing so far as quality, whether good or bad, is concerned ; that the barometer affects cigars far more than the thermometer ; that the silky-looking wrapper is as much to be avoided as the veiny one or the one that is oily in patches ; that cigars should neither be so soft as to yield readily to the pressure of the fingers nor so dry as to crackle ; that most of the talk about " condition " is pure ignorance, the Americans being right in preferring a moist cigar, and the English equally right in preferring a drier one—the vital point in each case being the proper period of recovery from the sea-sickness that cigars contract as easily as their smokers, a period that varies with the length of the voyage ; that except for the expert, who has given his whole life to the business, there are virtually no outward indications that can be relied upon in choosing a cigar ; and that for the average man, anxious to find our whether a given Havana is of good quality throughout and will burn well, the only real test is to smoke it."—Sydney Brooks, *Daily Mail*, Apr. 19, 1911.

That an inverted egg-cup placed in a pie collects the juice or gravy and prevents it boiling over

It is true that when a pie is so treated, and it has become cool or cold, juice will be found in the egg-cup, but this collection has taken place since the pie was taken out of the oven, and far from preventing the juice from boiling over, its tendency is to increase the chance of such a loss, for when the pie gets warm the air in the egg-cup expands and displaces the juice which could otherwise have occupied the space covered by the egg-cup. In other words the egg-cup is empty, except for steam, while the pie is baking, but directly cooling begins the steam in the egg-cup contracts and condenses, and the juice enters the egg-cup.

The reason for placing an egg-cup in a pie is to hold up the crust, and china supports are made for this purpose, which have holes in them to prevent their entrapping air or steam.

The question was once asked in a physics exam. paper,

" What is the reason for placing an inverted egg-cup in a pie, and on what principle does it act ? " The reply was elaborate, and ended with a delicious P.S., proving how confused were the candidates' ideas. The P.S. was, " The egg-cups must not be more than 34 feet high ! " He was evidently thinking of the water barometer and the limiting length of a vertical suction pipe of a pump.

That flannel worn next the skin is too warm in hot climates

This idea, which is still prevalent, was dealt with as follows by Dr. John Jones, as long ago as 1797, in his *Medical and Vulgar Errors Refuted*, p. 87 : " Just the contrary ; for it is the warm wet bath of a person's own sweat, confined by a linen shirt, which renders the heat of a warm climate so insupportably troublesome. Flannel, by promoting perspiration, favours its evaporation ; and it is a well-established fact that evaporation always produces positive cold."

Modern writers on hygiene certainly recommend the wearing of flannel next to the skin in all climates, as a wet flannel shirt is far less likely to cause a " chill " than a linen or cotton one.

That by using fire-balls of fire-clay in household fires, the calorific value of the coal is increased

We cannot create energy, and as heat and energy may be converted from the one to the other, this is the same as saying we cannot create heat. We may waste our coal, in fact, *usually* do so badly in its domestic use, and frequently do so even in using it commercially. Hence there are degrees of efficiency in the burning of coal, and it is this which may be in mind when it is thought that the calorific value of the coal is increased. The calorific value is the theoretical maximum quantity of heat which it is capable of yielding, and we cannot increase this by any means, but we may burn it more, or less, efficiently, and by using fire-balls this efficiency might be increased, but I do not think this at all likely, unless the grate is far too large, in which case the fire-balls would have the effect of making the capacity of the grate smaller. The use of fire-balls probably makes a fire retain heat for a longer period after it is left to go out, but they would also prevent the fire attaining its maximum heat for a similar period, whether the fire be lighted with the balls in the grate, or whether they be put in after the fire is well alight, so that

there would be no net gain. To get the best result from a domestic fire it is necessary that it should glow brightly, and that the resulting radiant heat be not screened off from the room by fire-bars, but glowing coals are as good, probably even better than glowing fire-balls. Similarly it is necessary that the " fuel " of a gas stove should glow brightly, for the radiant heat given off by a body is proportional to the fourth power of its *absolute* temperature.

That tobacco is a good thing with which to stop bleeding

" The plan of trying to stop bleeding with tobacco must never be used, as there is great danger of the patient becoming poisoned."—*First Aid to the Injured*, by Dr. Peter Shepherd, and revised by Robt. Bruce, M.R.C.S.

" When a small blood vessel is wounded the hæmorrhage may be arrested by the coagulation (clotting) of the blood alone. The clot occludes the wound and the open mouth of the cut vessel. Even a moderate sized blood vessel may become occluded partly by the clotting of the blood and partly by the contraction and retraction of the walls of the artery. Coagulation of the blood may be accelerated by (*a*) cold, in the form either of a stream of ice-cold water, of lint or pads of cotton wool soaked in the water, or of pieces of ice applied to the bleeding point ; (*b*) hot water at a temperature of 115° F. applied as a stream or in pads on the part."—Sir James Cantlie, M.B., F.R.C.S., in the British Red Cross Soc.'s *First Aid Manual*, p. 84.

That glycerine is inflammable

Glycerine has a formidable looking chemical formula, CH_2OH, $CHOH$, CH_2OH, which indicates that it is a trihydric alcohol, and were this generally known it might account for the idea of its being inflammable. On account of its alcoholic tendencies, chemists prefer to call it glycerol. Being transparent and viscid it looks much like " refined liquid paraffin," the popular laxative, which is slightly inflammable, but glycerine is certainly not inflammable, though if some be placed on a match stick and the match lighted, some decomposition takes place and there is a spluttering unwilling combustion. This result is obtained with some difficulty, the greater tendency being for the glycerine to extinguish the lighted match.

E. Lankester, M.D., F.R.S., pointed out the error in

his *Uses of Animals to Man*, p. 120: "I would here call your attention to the fact that this glycerine is not an inflammable body. . . . if you take one each of all the candles in the present day that are manufactured from fat and test them, you will observe that those candles burn best which are made of the fatty acid after the glycerine has been got rid of."

That ivy growing on the walls of a house makes them damp

Owing to the size and position of any given wall of a house it is exposed to the wind and rain of its immediate vicinity, so that it would only be a matter of trouble and expense to determine the exact quantity of water which impinged on the wall during a period of several years, and from this the average quantity of water reaching the wall in a given time could be calculated. Now suppose we possessed this information about a particular wall; then suppose that the wall were covered with ivy in the usual manner, it is obvious that on the average the same amount of rain would reach the surface of the ivy as previously reached the surface of the wall, no more and no less, for the ivy has no magnetic action by which the rain drops could be attracted to it in greater number or size than before, but the leaves of the ivy would act as a group of little umbrellas preventing a large proportion of the rain from reaching the wall, and instead causing it to drip from leaf to leaf and thus reach the ground. Of that which did arrive at the wall some would be absorbed by the innumerable claspers or rootlets by which ivy attaches itself to walls, so that the net result would be to keep the wall drier, and the only adverse effect that might occur is that the ivy might prevent the water absorbed by the wall from being so quickly evaporated by the action of wind and sun, but this effect would be very small compared with the quantity screened off by the leaves.

"In regard to buildings clothed with ivy, there is nothing to be feared so long as the plant does not penetrate the substance of the wall by means of any fissure. Should it thrust its way in, the natural and continuous expansion of its several parts will necessarily hasten the decay of the edifice. But a fair growth of ivy on sound walls that afford no entrance beyond the superficial attachment of the claspers is, without any exception whatever, beneficial. It promotes dryness and warmth, reduces to a minimum the corrosive action of the

atmosphere, and is altogether as conservative as it is beautiful."—*Ency. Brit.*, Vol. XIII., p. 527.

" At any rate it is now well known that nothing tends so much to keep walls dry as ivy, especially west ones against which the rain beats hardest."—Sir Edmund Beckett, Bart., p. 110, *A Book on Building* (1876).

That only evil smelling odours are dangerous

The deleterious effect of a substance is not proportional to the unpleasantness of its smell.

Nitrous oxide gas, " laughing " gas, which is used by dentists to produce a brief anæsthesia, is not evil smelling, it is rather pleasant, but after inhaling it for a short time one is suddenly overcome by it without warning. Carbon monoxide gas is tasteless and has only a faint smell, but it is a deadly poison. Chloroform has a pleasant smell, and nice taste, but of course produces fatal results if too much is taken and the same remarks apply to sulphuric ether.

Hydrocyanic acid has a pleasant smell of bitter almonds (which contain a minute quantity of the acid), but is one of the most deadly poisons, while the terrible " mustard " gas of the European War is perfectly inodorous and invisible, so that its victims were unaware of its presence until its dreadful effects began to appear on their person. The gas called Lilac Death by the French also had a pleasant smell.

That porpoise boots and shoes are made of material obtained from porpoises

Frank T. Bullen's *Cruise of the " Cachalot "* (1897) *reeks* of the sea ! *Kipling* said of it, " It is immense—there is no other word. I've never read anything that equals it in its deep-sea wonder and mystery ; . . . I congratulate you most heartily. It's a new world that you've opened the door to."

At p. 17 of this vivid book we read, " Porpoises have no skin, that is hide, the blubber or coating of lard which encases them being covered by a black substance, as thin as tissue paper. The porpoise hide of the boot maker is really leather made from the skin of the *Beluga*, or ' White Whale,' which is found only in the far north." With this last sentence the *Harmsworth Ency.* agrees, and states quite definitely that it is not obtained from the porpoise. At p. 28, *ibid*, we find, " The true dolphin (*Delphinidæ*) is not a fish at all, but a mammal—

a warm-blooded creature that suckles its young, and in its most familiar form is known to most people as the porpoise. The sailor's ' dolphin,' on the other hand, is a veritable fish, with a vertical tail fin, instead of the horizontal one which distinguishes all the whale family, scales and gills."

That a wire-net fire-screen is more effective in screening the heat of a fire than a sheet of the same metal the same thickness as the wire of the wire net

The reason for the belief appears to be that the principle of the Davy or Stephenson safety lamp is thought to apply, or that, because there is more metal in the sheet than in the netting, it will soon heat up and send out heat. The action of a fire-screen is to intercept the radiant heat from the fire, consequently radiant heat will pass through the meshes of the wire netting without any loss, and that which strikes the wire of the netting will be arrested and cause the temperature of the netting to rise. If there were no loss of heat from the netting by conduction, the temperature of the wire would continue to rise until its temperature was such that the amount of radiant heat it received from the fire was equal to the amount of radiant heat which the netting gave off. But due to the rise of temperature of the wire, the air in contact with it is heated and rises. Thus much of the heat of the screen is carried off by convection. With a sheet metal screen the action is similar, except that no radiant heat passes directly from the fire through the screen ; all is stopped by the sheet. Per pound of metal in the screen the netting has a larger surface exposed to the convection currents of air and consequently its steady temperature is somewhat lower than that of the sheet metal screen, and there is less total weight of it to radiate heat than in the case of the sheet screen, but these effects are more than counterbalanced by the sheet screen not letting any of the radiant heat of the fire pass through it.

That the " stuffiness " and " closeness " of the air in a room are due to an excess of carbonic acid gas, or to organic poisons from the breath

At pp. 601-3 of *Nature,* Jan. 6, 1921, there is an article on " Science of Ventilation and Open-air Treatment," from which is excerpt, " According to the popular notion, ' stuffiness ' and ' closeness ' of the air are due to an excess of carbon

dioxide in the air, or to organic poisons from the breath. All recent work goes to prove the falsity of these old views. . . . up to 3 per cent. of carbon dioxide in the air breathed produces no unpleasant effects. . . . It is now abundantly proved that the enervating effects of close and confined atmospheres are due to 'heat stagnation' within the body. . . . Circulation of the air by fans in the roof brought great relief to the occupants of the chamber."

DOMESTIC FALLACIES

(b) FOOD

That Salt Water Takes the Salt out of Salt Meat More Quickly than Fresh Water

This is asserted by old sailors. In the old days of sailing ships, and in the early days of steamers, before they had large cold-storage rooms in which to keep a supply of frozen fresh meat, quantities of salt meat used to be laid in, and, previous to being cooked, it used to be tied up in a sack, a rope attached, and the sack slung overboard so as to trail in the water. By this means it was brought in contact with a large volume of water containing about 3·6 per cent. of saline matter, whereas the salt meat would be pickled in a saturated solution (35 per cent.) of salt, and usually would have crystals of salt sticking to it. Hence the percentage of salt in the meat would be greatly reduced, but it could never fall below the saltness of the sea water. Now fresh water was scarce and expensive in those early days, and they could not afford to use a large quantity of it for washing salt meat in, so suppose they took a bucketful of fresh water and put a large piece of salt meat in it, in a short time the water would contain more than 3·6 per cent. of salt (the quantity in sea water) and the meat on being eaten would be found to be salter than that treated by the previous method. Hence arose the fallacy ; for it is ridiculous to suppose that if the salt meat were slung overboard in fresh water, as when going up a river for the same time it would not be less salt than that treated in sea water.

That only Mushrooms Peel

Peeling is one of the characteristics of the mushroom, but it certainly would not do to rely on this or any other single characteristic alone, for some other fungi besides the true mushroom undoubtedly peel.

When young the gills of the mushroom are rose-coloured, and brown-black when old. The gills never grow boldly against the stem, or run down it. On being broken, the flesh remains white, or nearly so. The cap has a frill at the edge ; stem solid or slightly pithy (often with maggots in it). Mushrooms are small in size (4 to 5 inches in diameter as a maximum, though there is a larger variety, the flesh of which is coarse), dry, and grow only in exposed positions. Their smell is very characteristic.

It is said that the peasants in Italy place a small silver coin in the utensil containing the mushrooms. Should the coin be at all discoloured when the latter are cooked, it shows that they are poisonous and ought to be thrown away. If, on the other hand, the silver remains bright, the mushrooms may be eaten with impunity.

Mr. R. B. Brooke, of Norwich, writing on Aug. 19, 1905, said :—

" We have two safe mushrooms which are common in one part or another of England : the large field mushroom, *Agaricus officinalis*, being the one best known in the East of England ; while *Agaricus campestris* (the fairy ring mushroom) is the most frequent in the Midlands and the North and South. I have seldom found the latter in Norfolk, for instance, although I have found several other kinds of edible fungi.

" *A. campestris* is recognisable by its frilled stalk, which in a mushroom of one day-old will be found adhering to the overlapping fringe of skin that covers the cap. The same form of stalk pertains to both those—viz., a gradual thickening towards the base and a clear space at the top between the stalk and the gills or fleshy parts. In both the gills are somewhat wavy and irregular, and appear to overcrowd each other, differing in this particular from those poisonous kinds whose gills are straight and regular as the spokes of a wheel. In both these agarics the flesh of the gills will darken on the application of salt, and will not turn green or pale in colour.

" In both the skin will peel off freely, and both have the same peculiarly pleasant earthy smell. The fairy ring mushroom always grows out in the open. The other grows sometimes under trees—oaks frequently—and it is not to be let alone on that account, providing that it will satisfy the above tests."

"Poisonous Mushrooms: A Warning.

"To the Editor of *The Daily Mail.* Nov. 5, 1915.

"Sir,—I have to-day received for identification (from Cardiff) some fungi of evil reputation which so nearly resemble the edible mushroom yet are not that species that I think it very desirable to direct attention to the points of difference.

"They differ from the true mushroom chiefly in the peculiarity of the outer flesh turning yellow when bruised; they are of the same size as that species, but the stem is perhaps a little longer, stains yellow, and has a peculiar silky appearance causing it to glisten in certain lights. In some specimens the cap is brownish and cracked; in others it is whitish, like that of the mushroom.

"It is undoubtedly the species that I gathered at Haslemere in August, 1906. It nearly killed me, and I did not recover good health till 1913. Apparently it has a deleterious effect upon certain constitutions only, for my wife and a friend partook of it without experiencing any ill effects. The fact that it may cause serious illness makes it advisable to exclude it from our list of esculent species.

"As it flourishes in late autumn as well as summer it would be well to examine very carefully all 'mushrooms' appearing in the fields at this time of the year. If any show the characters mentioned above they should be rejected as unfit for food. E. W. Swanton.

"Haslemere Educational Museum, Nov. 1."

Do not rely on these notes alone, but with them and the experience of gathering a hundred with someone who is an expert, you ought not to make a mistake.

That Cutting Off Two or Three Inches of the Proximal or Stalk end of a Cucumber and then Rubbing the Two Portions together Takes away its Bitterness

This is obviously only a mechanical action; therefore, if the bitter substance is removed, it must be in the white froth which results from the rubbing; but we have tasted this white foam, and, while it is not particularly luscious, it is certainly not very bitter. Even supposing that the rubbing can cause any pumping or suckling action, how can we conceive of the bitter principle only being withdrawn and not the rest of the moisture and flavour of the vegetable? What gives the bitterness the convenient property of coming

out on the slightest provocation? And could we not apply the same method to "the unruly member" by cutting off its distal portion (in this case), rubbing the parts together, and thus prevent it speaking any more bitterness? True, some cases would require a lot of rubbing, but still it might be tried. Furthermore, if after following the instructions in the heading of this article, we cut off a portion of the distal end and rub these new surfaces together, we again get a white froth, which, according to the fallacy, we presume the first rubbing at the other end should have completely removed.

What we believe is this: The stalk-end is formed of rather coarser material, and does taste more bitter than the rest of the cucumber, even when the whole has been peeled. Hence by cutting off and throwing away three inches of this end, we cut away the most bitter portion and prevent it being tasted.

That Cracking the Shell of a Properly Boiled Egg Directly it is Taken out of the Water Prevents it Going Hard

The idea in cracking the shell is evidently to prevent there being a pressure of steam within, which, if it were possible, would keep the substance of the egg at some temperature above 212° F. (the temperature of boiling water) for some time, whereas by reducing the pressure to atmospheric pressure the temperature falls more quickly.

Eggs are always boiled in an open saucepan, that is, the lid is left off in order to prevent their cracking. The reason for this is that a tightly-fitting and somewhat heavy lid would cause a pressure of steam in the saucepan greater than atmospheric pressure, therefore the temperature of the water would be above 212° F., and in this case it would be possible for the fluids inside the egg-shell to be raised slightly above 212° F. (though never so much above as the water in the saucepan). This might cause the pressure in the egg to be above atmospheric pressure, and the shells to burst slightly when the external pressure was reduced to atmospheric pressure by removing the lid. But with an open saucepan the temperature of the water can never be above 212° F., therefore the temperature of the fluids in the egg can never be above 212° F., nor their pressure more than atmospheric pressure. Consequently there can be no steam pressure to "let out" by cracking the shell, which is there-

fore a useless operation. Furthermore, the shell and shell membrane are not air-tight, for the chick in its development has to breathe, and the air for this purpose passes through the shell; so that even supposing the pressure were slightly above that of the atmosphere, it would soon be reduced by the escape of steam through the shell.

To preserve eggs it is necessary to render their shells air-tight, by the application of grease, or water-glass, or by some other means.

That Cocoa is Made from Cocoanuts

The cocoanut palm (*Cocos nucifera*), as the name implies, belongs to the order *Palmaceæ*, which grows in the tropics, and supplies the prizes in the national game without which no seaside is complete. Etymologically it is better to spell the name coco-nut, which is not so misleading as cocoa-nut. The large cocoanut is contained within a thick pericarp, or outer covering (rarely seen in England), which is very fibrous and affords "coir fibre" (same as cocoanut fibre) used for mats, brushes, &c. The hard shell (which is really the inner layer of the pericarp) is known as the endocarp.

Prof. Ernest Weekley, M.A. (*The Romance of Words*, p. 20) says, " . . . *Coco* is a Spanish baby word for an ugly face or bogie-man. The black marks at one end of the nut give it, especially before the removal of the fibrous husk, some resemblance to a ferocious face."

It is said that when Dr. Johnson was writing his dictionary he had an article on the "coconut," but a careless proof-reader passed a printer's mistake in the spelling of the word, which appeared as "cocoanut."

"Cocoa is prepared from the seeds of *Theobroma cocoa*, which belongs to the order *Byttneriaceæ*, and is grown in Trinidad, the northern provinces of South America, and Brazil. The seeds, closely packed, are contained in a pericarp 4 to 6 inches long and 2 or 3 inches in diameter. They are dried, roasted, and ground to form cocoa. Finely ground, made up into paste, and flavoured, they form chocolate. In 1890 nearly 28 millions of pounds of cocoa were imported into Great Britain, upwards of 20 millions being entered for home use."—Prof. Daniel Oliver, F.R.S.

Hence we see cocoa is a corruption of cacao, the name of the tree, and cocoa-nut is a corruption of coco-nut, through a mistaken connection.

That Fish Contains Certain Elements which adapt it in an especial manner to Renovate the Brain, and to Support Mental Labour

"I may here advert to a belief which appears to be widely entertained, viz., that fish contains certain elements which adapt it in especial manner to renovate the brain and to support mental labour. There is no foundation whatever for this view. The value of fish to the brain-worker is due simply to the facts already referred to, viz., that it contains, in smaller proportion than meat, those materials which, taken abundantly, demand much physical labour for their complete consumption, and which without this produce an unhealthy condition of body more or less incompatible with the easy and active exercise of the functions of the brain."—Sir Henry Thompson, M.B., F.R.C.S., in *Food and Feeding*.

Dr. E. S. Reynolds, M.D., F.R.C.P., says (*Hygiene*, p. 137), "It is doubtful if fish is a true brain food, though it contains a large proportion of phosphorus."

That it is the Best Practice to Employ Nothing in our Diet but Matter which has Nutritive Value ; and therefore that the Husk of Wheat Should be Removed before it is Ground into Flour

On this subject Sir Henry Thompson, M.B., F.R.C.S., remarks: "No portion of the husk of the grain should be removed from the wheat when ground, whether coarsely or finely, into meal. That a partial removal is systematically advocated by some as an improvement is one of the numerous illustrations of the modern and almost universal craze which just now exists among food purveyors of almost every description for eliminating all inert or innutritious matter from the food we eat. This extraordinary care to employ nothing in our diet but matter which has nutritive value—that is, can be absorbed into the system—is founded upon want of elementary knowledge of the first principles of digestion ; and yet, strange to say, the mistaken, indeed mischievous, practice is supported, probably for want of thought, by many who ought to know better.

"It seems now to be overlooked that no proper action of the intestines can take place unless a very considerable quantity of inert matter is present in our daily food, existing

as material which cannot be digested. By this character we are not to suppose that it is in the least degree ' indigestible' in the sense of that term when employed to signify ' difficult digestion,' but only that it passes unchanged through the body, neither receiving nor exciting any action. When there is a considerable portion of this in the food, the bowels can act daily and regularly, having a mass which they can transmit. When, on the other hand, the food is so ' nutritious ' as to be almost entirely absorbed, there is very little solid matter to transmit, and the action of the bowels is infrequent, irregular, and unsatisfactory. This is, in fact, very extensively recognisable of a great deal of the habitual constipation so prevalent among the middle classes at the present time."

That Salt Water Mussels are Poisonous at Certain Seasons and that the Poison Resides in a Particular Part of the Mussel

Dr. Charles Warden says: "To some constitutions (gouty, for instance) mussels are always poisonous—at any rate, may prove so injurious that they may be denominated poisonous."

Dr. Percy Frankland, F.R.S., at p. 132 of *Our Secret Friends and Foes*, says: "Brieger has isolated a very poisonous substance from decomposing mussels, and other poisonous materials have been separated from decomposing cheese." Besides, there is a number of cases on record where pork, fish, and other flesh have poisoned several people at a time. Hence we conclude that it is not the time of the year that makes mussels poisonous, but that it is the delay from the time when they die to when they are eaten, which may be long enough for the poison to be formed, that causes the trouble.

"Mussels, it is well known, sometimes produce nettle-rash, and other unpleasant symptoms; so that it is common to say that people are *musseled*. We often hear it stated that this depends on a certain part of the mussel, and that when this part is taken out, there is no fear of bad effects arising. I cannot, for my own part, speak on this point, but I will simply quote what Dr. Paris (*On Diet*, p. 163, 1836) states: ' The mussel,' says he, ' is a species of bivalve, which is more solid, and equally as indigestible, as any animal of the same tribe. The common people consider them poisonous, and in eating them, take out a part in which they suppose the poison principally to reside. This is a dark part, which is the heart, and is quite innocuous; the fact, however, is sufficient to prove

that this species of bivalve has been known to kill, but not more frequently perhaps than any other indigestible substance.' "—J. B. Harrison, Surgeon, *Chamb. Edin. Jour.*, 1849, p. 142.

That the Colour of Green Tea is Produced by Drying the Leaves on Copper Trays

Mr. Ball, in *Cultivation and Manufacture of Tea*, says: "The leaves of green tea are roasted also in an iron vessel, but as soon as gathered, without any previous manipulation, all heating or fermentation of the leaves being studiously avoided; they are then rolled as black tea, and finally dried in the same vessel in which they have been roasted, by constantly stirring and moving them about. They are also fanned to hasten evaporation, and the drying and formation of the peculiar characteristic colour of this tea, which it gradually acquires in this process, and which resembles the bloom on some fruits."

"The colour of Chinese green tea," says Mr. James Paton in the *Ency. Brit.** "is entirely due to the rapid drying of the fresh leaves, which prevents the chlorophyll from undergoing any alteration.

"The green tea sent out from China is almost invariably faced or glazed with artificial colouring matter, particularly with a powdered mixture of gypsum (calcium sulphate) and Prussian blue (ferrocyanide of iron). Indian green tea never owes any of its colour to 'facing' with foreign substances."

That the Dangerous Qualities of Bad Water are Obviated by the Addition of Wine or Spirits

This is one of the dangerous fallacies, for it might easily get its believers into trouble. The late Sir Henry Thompson, F.R.C.S., to whom the author is greatly indebted for his permission for these quotations to be made, said on this important subject: "The only water safe for the Continental traveller to drink is a natural mineral water, and such is now always procurable throughout Europe, except in very remote or unfrequented places. In the latter circumstances no admixture of wine or spirit counteracts the poison in

* NOTE.—All the references to *Ency. Brit.* are to the 9th ed. unless any other edition is named.

tainted water and makes it safe to drink, as people often delight to believe, but the simple process of boiling renders it perfectly harmless." A memorandum issued by the Local Government Board states: "It cannot be too distinctly understood that the dangerous qualities of bad water are not obviated by the addition of wine or spirits" (Art. 7).

That an Egg that has been Soft-boiled and allowed to get Cold cannot be Hard-boiled by Re-boiling

"We have seen the above in print, therefore," some say, "it must be true!" But it is not. We have consulted many about it, and it appears to be a fairly common fallacy. One individual who had not heard of it made up for this deficiency by saying that she had heard that a hard-boiled egg could be softened by re-boiling! Well, we live and learn—or at least some of us try to.

Now for some facts. Two new-laid eggs were boiled for 2½ minutes, the water was boiling when they were put in. On being taken out one was opened at once and found to be just nicely soft-boiled, so nicely, in fact, that it was at once eaten! The other was kept five hours, by which time it was quite cold, and was then put into boiling water and boiled for 20 minutes; it was then taken out, cut in two, and found to be decidedly hard. It was pointed out to the author that the "control experiment" (*i.e.*, the first egg) was not satisfactory, for had it not been opened and eaten it might have become hard by the time it was cold; so that we could not be certain that the second egg really was soft when it was started on its second boiling. Hence we boiled two more eggs for 2½ minutes. They were both left for 18 hours, and then one was opened. This was not quite done, that is to say, the white next to the yolk was not set. Hence this experiment was not considered satisfactory, though we boiled the second egg a second time for 15 minutes and then found it was hard. In the third and last experiment we boiled two eggs for 3 minutes, left them for 25 hours, opened one, found it just nicely cooked, boiled the other 15 minutes, and then found it quite hard. This we considered entirely satisfactory, and in future, fair housewife, you will be able to hard-boil for salad all cold soft-boiled eggs that happen to be left from breakfast, though there is no reason why a cold soft-boiled egg should not be boiled for 2 to 2½ minutes to warm it without hard-boiling it.

That if Water contains a Large Number of Bacteria of any kind it is necessarily Unfit to Drink

Dr. Percy Frankland, F.R.S., when speaking at the Institution of Civil Engineers some years ago, mentioned this error. After pointing out that there are numbers of bacteria which are harmless to man, nay, which are most useful to man, for they attack the bacteria which are harmful to him, he gave as an example the case of a vessel of water which on a certain day was as pure and fit for drinking as it was possible to have it, though containing a few of these friendly bacteria. Now, letting this stand for a few days in a manner impossible for it to become contaminated in any way, the number of these friendly bacteria would increase enormously, and yet, he remarked, the water could not be said to be in the least less fit for drinking than it was in the first instance.

As a proof that the presence of bacteria is not synonymous with death to us, we may mention that numbers of the bacillus *Coli communis* are normally present in the human intestines. We may go still further and say that we probably could not live if our bodies were perfectly sterilized.

That Sugar is Made from Bullock's Blood

The origin of this fallacy is clear. In the process of manufacture the solution of brown sugar is passed through animal charcoal to de-colour it, and the animal charcoal is made from bullock's blood. There are at least two reasons why the fastidious should be appeased, (i.) because they do not mind eating the bullock's flesh which has yielded the blood; and (ii.) because to carbonise the blood great heat is required, and thus all forms of life, bacterial or otherwise, are destroyed.

If a side of a lump of sugar be melted by means of a candle-flame the resulting liquid has a red appearance. This fact no doubt tends to keep the popular idea alive.

That it is Bad to Begin a Dinner with Soup because it Dilutes the Gastric Juice

Soup is food which is nearly digested, so that little is left for the digestive organs to do. It is, therefore, rapidly absorbed and refreshes the system in a few minutes, making the diner feel more fit to go on with the rest of the meal.

See *Food and Feeding*, 8th ed., by Sir Henry Thompson, F.R.C.S., p. 146.

That it is a Good Thing to Take a Glass of Sherry Before Starting Dinner

Sir Henry Thompson, F.R.C.S., *Food and Feeding*, p. 146, says this is "a gastronomic no less than a physiological blunder, since it (sherry) overstimulates and tends to injure an empty stomach, while it depraves the palate," while at p. 166 he says: "After all, those who drink water with dinner probably enjoy the pleasure of eating more than those who drink wine. They have generally better appetites and digestion, and they certainly preserve an appreciative palate longer than the wine-drinker."

Nowadays, when total abstinence has received such strong support from the great and able men of all callings—the late Lord Chief Justice Alverstone, the Chief Justice of the Divorce Court, Lords Roberts and Kitchener, Sir Victor Horsley, F.R.C.S., &c.—it is not difficult to obtain decided opinions from those most qualified to speak, but for all this we should like to conclude with yet one more quotation from Sir Henry (p. 160): "I am of opinion that the habitual use of wine, beer, or spirits is a physiological error, say, for 19 persons out of 20 (= 95 per cent.). In other words, the great majority of the human race, at any age or of either sex, will enjoy better health, both of body and mind, and will live longer, without any alcoholic drinks whatever, than with habitual indulgence in their use, even although such use be what is popularly understood as moderate."

That Hors-d'œuvres are Good Preliminaries to a Dinner

Sir Henry Thompson, F.R.C.S., to whom we are much indebted not only for his permission to quote from his well-known book, *Food and Feeding*, but also for his kind assistance in answering several questions addressed to him, deals with this fallacy at pp. 148 and 149 of the book cited, and speaks in no uncertain tone against the practice.

That Strasburg Geese are Roasted Alive in the Preparation of Pâté de foie gras

The process is so cruel that it needs no exaggeration. The goose is pinioned to a board by having its wings and legs spread out and fastened to the board so that it cannot

move. It is then placed before a fire to keep it warm, not to roast, and is forced to eat far more than it requires, the food being barley meal. The result of this cruel forcing and want of exercise is to cause fatty degeneration of the liver, which enlarges so much as to nearly kill the bird. If there were no demand for *pâté de foie gras* none would be prepared, and this cruelty would cease ; so that lovers of animals and others who do not approve of such cruelty can help to diminish it by not eating the product.

That Jelly Made from Gelatine is very Nutritious

Gelatine closely resembles albumin, gluten and casein, which substances are decidedly nutritious, and hence the natural mistake, especially when the chemical composition of gelatine is taken into account, for it contains about 18 per cent. of nitrogen, combined with 50 per cent. of carbon, 7 per cent. of hydrogen, 23 per cent. of oxygen, and small quantities of other substances. Its nutritive value—or rather its absence of such—has been tested by feeding animals entirely on it, with the result that they have died with all the symptoms of starvation. Volume for volume cream is far more nutritious than jelly.

Gelatine is obtained from bones, bone-dust, cartilage, &c., by boiling, and a small quantity makes a lot of jelly, thus further diluting what little value it has as a food. Hence do not think that because you succeed in getting invalids to take jelly you need not trouble further about their taking sufficient nourishment.

That Asparagus is Unwholesome

If it be so, it is curious that Sir Henry Thompson, M.B., F.R.C.S., does not mention the fact, instead of which he says that boiled asparagus served cold with a mayonnaise forms a dish of its kind not to be surpassed, and that it is valuable on account of certain salts (asparagin) which it contains. He gives an excellent note how it should be cooked, so as to get more of the stalks tender, by cutting it all to one length and then standing it in a deep saucepan, stalks down, with the tops standing 2 inches *out of* the water, so that they cook more slowly in the steam.

The *Lancet*, in May, 1906, had the following note on the subject :—

" There are no doubt examples of persons who exhibit

an idiosyncrasy towards asparagus and develop unpleasant symptoms after eating it, just as there are people who are poisoned by mutton or strawberries, but on the whole there is nothing to be said on physiological grounds against moderate indulgence in this very popular vegetable food." We have consulted several standard books on hygiene, and have failed to find anything said against asparagus.

That Crimping, *per se*, Improves Salmon

The reason for the improvement appears to be due to the fact that crimping *kills* the fish, killed fish having a better flavour than that of fish which has been allowed to die of asphyxia. Dutch fishermen always kill their fish, and this has the double advantage of improving the flesh and being a more merciful method.

Some think that crimping is cruel, and will not eat crimped fish in consequence, but Sir Henry Thompson, F.R.C.S., in *Food and Feeding*, p. 133, says it inflicts no pain whatever on the fish, and that were it otherwise he would not sanction it for any consideration whatever. The author wrote to Mr. John Colam, the Secretary of the Royal Society for the Prevention of Cruelty to Animals, on the subject, and he replied that "the crimping of salmon or cod is not, as has been supposed, horrible torture. The strength of these fishes is so great that it would be impossible to manipulate them if alive for the purpose of crimping. Consequently they are first stunned with a heavy mallet, then killed, and afterwards crimped. Even if the vertebral columns, as stated in your letter, were severed, the first severance would destroy all possibility of sensation."

That More Beer is Drunk, per Head, in Germany than in the United Kingdom

Germans and beer are inseparable in the English mind, but it turns out to be a case of what is vulgarly known as "pot calling the kettle black," for we drink about 25 per cent. more beer per head than the Germans, the exact figures being as follows :—

1899	*1903*	*1905*	*1901-5*				
31·9	30·0	33·3	29·5	galls. per head per annum in			United Kingdom.
27·1	27·4	26·0	26·3	,,	,,	,,	Germany.
13·0	14·5	—	—	,,	,,	,,	United States.
5·5	6·2	—	—	,,	,,	,,	France.

For spirits the figures were :—

1899	*1903*	*1901-5*				
2·07	2·0	—	galls. per head per annum in			France.
1·85	1·4	1·55	,,	,,	,,	Germany.
1·03	1·1	1·00	,,	,,	,,	United Kingdom.
0·92	1·4	—	,,	,,	,,	United States.

For wine :—

1899	*1903*				
24·64	*25·5*	galls. per head per annum in			France.
0·77	1·5	,,	,,	,,	Germany.
0·41	0·4	,,	,,	,,	United Kingdom.
0·23	0·5	,,	,,	,,	United States.

The remarkable thing about these figures is that in the matter of spirit drinking the figures are also the reverse of the popular idea. A still more remarkable fact is that for the period 1901-5 the Belgians drank on an average 47·8 imperial gallons of beer per head of population per annum. It must be remembered too that the English beer is much more alcoholic than German beer.

That it is Good to "Support" Aged Persons as They Grow Older with Increased Quantities of Food and Stimulant

Sir Henry Thompson, M.B., F.R.C.S., in *Food and Feeding*, says : "I desire to point out that the system of 'supporting' aged persons, as it is termed, with increased quantities of food and stimulant, is an error of cardinal importance, and, without doubt, tends to shorten or to embitter life. This erroneous practice ignores the important fact that, as age increases, the ability to eliminate food unnecessarily consumed notably diminishes. The functions by which surplus and effete matters are thrown off from the system are less active than in youth and middle age, and the results of over-feeding, which a robust constitution can get rid of without obvious evil, become a source of dangerous embarrassment to the feebler organisation of one advanced in years. Hence the appearance of a crowd of chronic troubles peculiar to the latter third of life are to a great extent avoidable. So far from continuing to select the strong nourishment which may have been necessary during the toil and anxieties of thirty years or more of adult energy and activity throughout the prime of life, the elderly man who desires to preserve fair health and to attain to longevity, should gradually diminish his use of strong nitrogenous and much fatty food. He should substitute a lighter dietary as he subsides naturally

and more or less gradually into the class of the sedentary, and adopt the regimen best adapted thereto, hereafter to be considered."

Lord Avebury, F.R.S., said that nine-tenths of us over-eat ourselves!

That Fruit is Leaden at Night

My Wimpole Street friend tells me fruit, *per se*, is not to be avoided at night, any more than any other article of diet which is easily digestible. Any food taken at night should be easily digestible.

That Liebig's Extract of Meat is the Concentrated Nourishment of Meat

". . . allusion may here be made to the many *extracts of meat* now on the market. Some of them are pure stimulants, and not food, while others are both. Among the former are Liebig's Extract, ordinary beef-tea and the soups. These are not proteid foods, . . . These extracts are really salty foods, . . . They are essentially stimulants, restoring both mental and bodily activity, but in no sense can be regarded as true nitrogenous food."—p. 143, *Hygiene*, Drs. Notter and Firth.

"Beef-tea . . . possesses only slight nutritive properties, though an exaggerated notion of its value is widely prevalent. . . . Gelatine is a useful food, but the more valuable albuminous or proteid portions of the meat have been coagulated by the process of boiling or stewing, and left behind in the shreddy meat, the beef-tea containing chiefly gelatine and the salts of meat, which have a comparatively small nutritive value. The same remarks apply to *Liebig's Extract of Meat.* This contains the salts and extractives of meat with a little gelatine. It is an admirable restorative stimulant, but the food-value of a teacupful of beef-tea prepared from it is probably no greater than that of the two lumps of sugar in a cup of tea."—p. 307, *Domestic Economy*, Dr. Newsholme and M. E. Scott.

Dr. J. J. Ridge, M.D.Lond. (p. 108, *Medical Temperance Dictionary*), writing under the heading "Meat Extracts," states, "Liebig's extract of meat has been long before the public, and a very erroneous idea is prevalent as to its properties. Many think it to be the concentrated nourishment of the meat. This is a great mistake. It contains scarcely

any nourishment and consists chiefly of some soluble and stimulating portions of the meat, known as creatine, creatinine, &c. . . . But it is not a substitute for food, as it does not contain material for rebuilding the wasted tissue."

That Currants are Unwholesome

By currants are meant the dried, seedless, small variety of grape, which originally came from Corinth (Corauntz), and hence their name.

The medical faculty have often written and spoken in their praise, Sir Francis Laking, the King's Physician, being one of their champions. Dr. F. W. Forbes Ross, F.R.C.S., wrote a eulogy of them in the *Daily Mail* of Feb. 23, 1907, and the *Lancet* has done its share to remove the cloud under which they are.

Garden currants (red, white and black), which grow readily in Great Britain, and which are either eaten raw, or when freshly cooked, have occasionally upset children, and even adults, and apparently some think that dried currants (*i.e.*, Greek currants, or practically small raisins) are dried garden currants, and that consequently they are unwholesome. Even if they were garden currants it would not follow that they are unwholesome, because all fruit (and other food) has disagreed with someone at some time or another, and though the raw or freshly cooked fruit might upset some, the dried fruit might not possess this disadvantage.

That White Milk is Less Rich than Dark Cream-coloured Milk

On Jan. 2, 1908, a solicitor at the South-Western Court said, " The public refuse to have white milk, and consequently dairymen are forced to colour it. People, in their ignorance, think the natural colour of milk is cream-like, whereas it is white."

The same remarks apply to butter, there being a popular prejudice against light-coloured butter, so that it is common for both milk and butter to be coloured a light yellow. The author has seen a bottle of milk-colouring material in the dairy of even a millionaire !

On referring to the following authorities, each of whom has several pages on the subject of milk, not a word in support of the popular notion was found :—

Hygiene, J. L. Notter, M.D., and R. H. Firth, F.R.C.S.
Artificial Feeding, W. B. Cheadle, M.A., M.D., F.R.C.P.

Food and Feeding, Sir Henry Thompson, F.R.C.S.
Domestic Economy, Sir Arthur Newsholme, M.D., and M. E. Scott.
Harmsworth Encyclopædia.

That Separated or Skimmed Milk is not Nutritious

At p. 47 of *Domestic Economy*, by Sir Arthur Newsholme, M.D., D.P.H., and Margaret E. Scott, we read, " Skim milk is highly nutritious ; but when sold, as it frequently is in large towns, for *whole* milk, and at the same price as whole milk, it constitutes a serious fraud, as cream is more expensive than milk, and the cream of milk is a very valuable food for children.

" Skim milk and potatoes form a very nourishing dish ; and with some dripping added to the potatoes to compensate for the cream which has been removed from the milk, we obtain a complete and yet very inexpensive meal. It is unfortunate that skim milk is not sold in large quantities in town *as such*, for its food value is very high."

An article by " A Physician," on tuberculosis, appeared in the *Daily Mail* of Jan. 6, 1913, in which he said, " If the patient can afford to buy food at all he can afford to build up his system with such valuable food stuffs as separated milk, Dutch or American cheese, dripping, oatmeal, lentils and herrings, all of which are especially suitable for the consumptive."

Sir Malcolm Morris, M.D., F.R.C.S., in his presidential address on May 8, 1919, to the Institute of Hygiene, said, " It ought to be more widely known that skimmed milk is far more nutritious, in proportion to price, than whole milk, and that there is nothing to choose between margarine and butter."

Dr. Thomas Oliver, M.D., F.R.S., wrote to the *Daily Mail* to the same effect on Jan. 23, 1918.

That Beef-Tea is very Nutritious

" Perhaps the most prevalent common error as to food is that beef-tea is the most nutritive of all foods. This is very far from being the case. If half-a-pint of ordinary beef-tea be evaporated down, there is barely a teaspoonful of solid matter left. The table at p. 297 has shown that raw beef juice contains three times as much nourishment as beef-tea made in the ordinary way. Beef-tea is a valuable stimulant

and restorative, but its *food value is grossly exaggerated* in the popular mind. The person who had to feed on it alone would fare badly indeed!"— Sir Arthur Newsholme, M.D., and M. E. Scott, in *Domestic Economy*, p. 306.

"As commonly made, according to the directions in most cookery books, beef-tea is a gigantic fraud. The common mistake is that it is directed that the beef should be boiled, the consequence being that the albumen of the meat is coagulated and so entangled in the meat that it does not get into the beef-tea at all. . . . It is a mistake to suppose that Liebig's extract, and similar extracts, contain any nourishment; they only contain the stimulating portions of the meat; . . . "—Dr. J. J. Ridge, *Medical Temperance Dictionary*.

"The one in most common use is beef-tea. Yet beef-tea is, after all, a poor food for little children, and I have been much struck with the very small amount of advantage they appear to obtain from it. . . . . "—Dr. W. B. Cheadle, *Artificial Feeding of Infants*, p. 111.

Sir Henry Thompson, and Drs. J. J. Ridge and W. B. Cheadle all give full directions on the best way to make beef-tea.

That Cow's Milk is Diluted for Babies and Puppies because it is too Nutritious to be Given Neat

The compositions of woman's milk and cow's milk are given in the following table:—

Constituents.	*Woman's Milk.*	*Cow's Milk.*
Nitrogenous elements ...	2·35	4·37
Fats	2·41	3·50
Carbohydrates (Lactine) ...	6·39	4·40
Lime	0·02	
Phosphoric anhydride ...	0·03	0·70
Other Constituents of Ash	0·30	
Water	88·50	87·03
Total	100·0	100·0

Hence we may admit that cow's milk is the richer in the sense that the percentage of water is *slightly* less, but this

is not the reason it is diluted for the purposes named. When milk of either kind enters the stomach, it is curdled by the action of the gastric fluids, and while the resulting curds of cow's milk are coarse and heavy, and therefore unsuitable for the delicate digestive organs of babies and puppies, the curds of woman's milk are fine and light flocculent granules which are readily soluble. The addition of water to the cow's milk does not entirely overcome its objectionable properties, but it mitigates them by reducing the percentage of nitrogenous matter and causing the curds to be somewhat smaller.

" If the baby does not take kindly to its food, boil it ! "

That Cow's Milk and Mother's Milk do not " Agree "

Dr. W. B. Cheadle, M.A., M.D., F.R.C.P., in *Artificial Feeding of Infants*, p. 45: " And here let me notice for a moment a popular prejudice which exists against hand feeding and suckling combined. A superstition still survives amongst nurses and matrons that the cow's milk and the mother's milk do not agree, as if they quarrelled in some curious way within the child's body and fought it out there to its great discomfort and damage. But this is a pure fallacy. The cow's milk may disagree with the child, but not the mother's milk, if it is healthy. . . . But it cannot be stated too strongly that a healthy mother should suckle her child, even if only able to give it a partial supply, to be supplemented by artificial means."

A similar belief is that nursery milk should be all from one cow.

That White Bread is More Nourishing than Brown, or than " Standard Bread "

If ever the law of the survival of the fittest went astray it has done so in the case of bread, for the whiter the bread the more popular it has been and the less its physiological value, though it would be wrong to assume that the darker the bread the better it is. On the contrary, the majority of the medical faculty now prefer " standard " bread, which has a cream colour and is therefore much lighter in colour than ordinary brown bread, and contains at least 80 per cent. of the whole wheat, only the coarse bran being removed. Before the advent of standard bread the choice lay between white, whole-meal, wheat-meal, or one of the fancy or patent

breads. Of these, undoubtedly the wheat-meal was the best, containing as it does the whole of the wheat ground fine; *i.e.*, even the bran is finely ground. This was the early form of all flour, and remained so in Cape Colony, and possibly many other places, until at least as recently as 1885, for the good reason that their complete mill equipment consisted simply of a pair of old-fashioned, horizontal, mill stones. There was none of the modern milling and refining (nutriment robbing !) machinery to do the harm, and turn a wholesome natural product into a mere heat-producing substance, with all the nutriment for bone, muscle, and teeth forming removed from it and sold at an enhanced price.

Thanks to the public spirit of Sir Oswald Mosley, who started a brown bread campaign early in January, 1911, there are now few people in England who have not at least had the opportunity of correcting themselves of a belief in this fallacy, for the *Daily Mail* vigorously took up the matter and a number of articles appeared in it between Jan. 10 and Apr. 7, 1911.

" We, the undersigned, believe it to be a national necessity that a standard should be fixed for the nutritive value of what is sold as bread. Such a standard has already been enforced by law for milk. The standardisation of bread is even more important, bread and flour forming about two-fifths of the weight of the food consumed by the working classes and constituting almost the whole diet of many poor children.

" In view of the inferior nourishing qualities of the white bread commonly sold in this country, we urge that legislation should be passed making it compulsory that all bread sold as such should, unless distinctly labelled otherwise, be made from unadulterated wheat flour containing at least 80 per cent. of the whole wheat, including the germ and semolina.

" (Signed) William H. Bennett, K.C.V.O., F.R.C.S.
W. A. Bond, M.D., M.O.H.
Alfred Fripp, K.C.V.O., C.B.
Alfred Pearce Gould, K.C.V.O., M.S.
Arthur Latham, M.D., F.R.C.P.
Hector Mackenzie, M.D., F.R.C.P.
J. J. Perkins, M.D., F.R.C.P.
J. F. J. Sykes, M.D., D.Sc., M.O.H."

Daily Mail, Jan. 26, 1911.

The signatories include Sir William H. Bennett, H.M. Inspector of Anatomy, consulting surgeon to St. George's Hospital; Sir Alfred Fripp, surgeon to the King; Sir A. Pearce Gould, senior surgeon to Middlesex Hospital; Dr. Arthur Latham, of St. George's Hospital; Dr. Perkins, of St. Thomas's Hospital and secretary of the National Association for the Prevention of Consumption; Dr. Hector Mackenzie, of St. Thomas's; Dr. Sykes, of Guy's, medical officer of St. Pancras; and Dr. Bond, medical officer of Holborn.

The following are some more opinions of distinguished medical men; the list could be extended almost indefinitely :—

" The manifesto is of incalculable national value, because it will go a great way towards killing the present inane demand for extreme whiteness in bread, irrespective of the loss of nutriment necessitated in acquiring this whiteness. The standard suggested will provide a fully nourishing loaf."—J. C. Thresh, M.D., D.Sc.

" If the public realised the difference between wholemeal and white bread they would at once demand the former bread, the nutritive value of which is so much greater."—Sir G. Sims Woodhead, M.D., Professor of Pathology, Univ. of Cambridge.

" The present defective condition of the teeth of children is, in my opinion, largely due to the present consumption of white bread, which requires very little mastication, and, moreover, forms a sticky paste round the teeth."—R. W. Jolly, M.D., Medical Officer of Health, Peterborough.

" All my work to date confirms my belief in the superior food value of ' standard ' bread."—F. Gowland Hopkins, D.Sc., M.B., F.R.S., Reader in Chemical Physiology to the Univ. of Cambridge.

In the *Daily Mail* of March 18, 1911, the following yet more strongly supported " New Manifesto " appeared :—

" In view of the public attention now being directed to the subject of bread, and in reference to the statement published by a Committee of the National Association of British and Irish Millers, that ' It is incorrect to state that the ordinary white flour, or even the highest grade flour commonly sold in this country is an inferior product and deficient in nutritive value,'

" We, the undersigned members of the Medical Profession and Scientific Associations, desire to reiterate the following statements contained in the Manifesto published by the Bread

and Food Reform League two years ago : Chemistry proves that the whole of the wheat grain contains more nutriment than the part usually made into fine white flour. Experiments made on the human digestion in America confirm the statements of the Bread and Food Reform League that more protein—flesh-forming material—can be assimilated from whole Wheat Meal when it is ground to a uniform fineness than when coarsely ground, whilst experiments in England show that from finely ground whole Wheat Meal the body can assimilate about 2½ times more of the mineral substances which form bones and teeth, and which nourish the brain, nerves and tissues, than from a similar weight of fine white flour.

" Dr. Robert Hutchison clearly states in the 1911 edition of *Food and Principles of Diet*, that ' Where bread forms the chief constituent of the diet, the use of a FINELY GROUND whole meal bread is advantageous from the mineral point of view.'

" The Manifesto of 1909 stated that there was still much prejudice against brown bread, even when made of finely ground Whole Meal, and advocated the use of ' Old-fashioned Household Bread, which is not brown, but cream-coloured, and retains about 80 per cent. of the grain, including the semolina, and especially the embryo or germ, now entirely discarded from the fine white flour. The germ has " singular richness in oil, in nitrogenous matters, and in phosphoric acid " (*Food*, by A. H. Church, F.I.C., F.R.S.), whilst experiments made by Professors Bunge and Sherman, described in Bulletin 185, U.S.A. Agricultural Department, show that Whole Meal contains four times more iron than fine white flour, and that a considerable portion is in a readily digestible condition.'

" As it has been stated that the presence of uncooked germ adversely affects the keeping qualities of flour, it may be mentioned that an eminent miller, at the request of Miss May Yates, Hon. Secretary of the League, studied this point, and flour containing 80 per cent. of the grain, including the germ and the semolina, made from thoroughly clean wheat, free from the bacteriological germs found in imperfectly cleaned wheat, was observed for six months, and at the end of that period showed no signs of deterioration.

" Attention is directed to the varying amounts of protein and ash found in different wheats in the League's Pamphlet on ' Standardisation of Bread,' and skilled millers blend them so as to obtain good results. But a flour containing 80 per

cent. of a poor wheat, yet retaining the germ and all the semolina, will contain more nutriment than a flour consisting of 70 per cent. of a similar wheat, deprived of the germ and of a large portion of the semolina. The semolina thus removed from household flour is used for making expensive 'patent' flours.

"The analysis of 80 per cent. flour made by Mr. Moor, M.A., F.I.C., and published in 'Standardisation of Bread,' showed that it contained more protein and 55·5 per cent. more mineral matter than ordinary white flour. As it had 76·5 less fibre than whole meal, it can be more easily digested.

"Recent chemico-physiological researches indicate that the absence, or insufficient supply, of a single small substance essential for the nutrition of the body may have a most serious influence on the health, as it cannot be adequately replaced by larger quantities of other substances.

"It is therefore of the utmost importance that bread and flour, which form *two-fifths* of the *weight* of food consumed by the working classes, and constitute almost *the sole diet of many poor children*, should contain a sufficient amount of all the nutritive parts of the wheat grain.

"We wish to express our recognition of the skill shown by millers in thoroughly cleansing the wheat grain, and we hope that when the trade realises the importance of supplying a Household Flour containing 80 per cent. of the grain, including the germ and all the semolina, they will devote their practical skill to producing this flour and bread.

"The following are the signatories to the manifesto :—

Sir William Bennett, K.C.V.O., F.R.C.S.
Sir W. Byers, M.A., M.D., M.A.O.
Sir Halliday Croom, F.R.C.S., M.D.
Sir Alfred Fripp, K.C.V.O., C.B.
Sir Herbert Maxwell, Bt., P.C., D.C.L., LL.D., F.R.S.
Sir John W. Moore, M.A., M.D., D.Sc., F.R.C.P.I., D.P.H.
Sir William Ramsay, K.C.B., F.R.S.
Professor Dreyer.
Professor Howard Marsh, J.P., M.A., M.C., F.R.C.S.
Professor Henslow, M.A., F.L.S.
President Windle, M.D., F.R.S.
Mr. A. W. Stokes, F.C.S., F.I.C.
Mr. C. G. Moor, M.A., F.I.C.

Dr. Sydney Davies, M.D., M.O.H.
Dr. S. Fox, M.S.
Dr. Garlick.
Dr. Harford, M.A.
Dr. F. G. Hopkins, M.A., D.Sc., F.R.S.
Dr. J. J. Perkins, F.R.C.P.
Dr. Pidcock, M.A., M.R.C.P.
Dr. Nathan Raw, M.R.C.P., F.R.S.E.
Dr. Charles Read, M.D., M.R.C.S.
Dr. H. E. Roaf.
Dr. Saleeby, F.R.S.E., F.Z.S.
Dr. St. Clair Thomson, F.R.C.P., F.R.C.S.
Dr. Theodore Williams, M.V.O., F.R.C.P.

"Finally, we may refer our readers to the Local Government Board report on the subject, which appeared in the press of April 7, 1911."

That Biscuits are Good for Babies

"Giving evidence yesterday at the inquest on her twelve-weeks-old son, who died of heart failure following bronchitis, Emma Lavinia Johnson, of Cumberland Street, Pimlico, S.W., stated that she fed the child with biscuits, acting on her landlady's advice. The landlady informed the coroner that all her children, as well as her sister's, had been brought up on biscuits.

"The Coroner: It shows great tenacity of race.

"Addressing the jury, the coroner said there was a kind of tradition in giving biscuits to babies, but every doctor knew and every mother ought to know that such food was extremely bad for young babies. Why not give the infant beef steak at once?

"A verdict of Death from Natural Causes was returned."
—*Daily Mail*, Nov. 30, 1911.

"Advising you *generally*, I would say, 'Do not give your child *any* biscuits.' I look upon them as a fruitful source of constipation."—Pye H. Chavasse, F.R.C.S., *Advice to a Mother* (14th ed.), p. 112.

That it is a very salutary Mean to assist Digestion, provoke an Appetite, and Preserve Health, for Healthy People to Drink a glass of Good Bitters every Morning

The above are the words of Dr. John Jones (p. 113, *Medical Vulgar Errors Refuted*) and so are the following:—

"People of fortune in general, from the variety of their food, and the luxury of their tables, and from the pleasure they find in it, eat much more than they ought to do; or, than nature requires. And instead of bitters, pickles, and cruet drugs, which hurry down their half-digested food through the *primæ viæ*, and thus create a craving for more than the stomach can digest; they ought rather, if cram and gormandize at any rate they must, to invent and use dampers, to prevent crapulas and crudities in the stomach, such as the coarsest bread with much bran in it, or the rasping of some insipid tree, such as the poor in Norway make use of for bread."

That Sick Persons ought invariably to be restrained to a very strict observance of rules, as to diet, as well as medicines

The above is another of the fallacies given by Dr. John Jones in his quaint work *Medical Vulgar Errors Refuted* (p. 165), which he proceeds to deal with thus, "*Hippocrates* thought otherwise, especially if the thing recommended should happen to cross the appetite of the patient; for, as he observes, meat and drink, though somewhat worse, if pleasing, ought to be preferred before better which is displeasing, so much depending upon the particular idiosyncrasy of the patient, which is no easy matter for another to discover."

That to Smell Bread is an Antidote for having Eaten too much Mustard

If there is anything in this idea at all, it may be that the smelling of almost anything causes a draught of cold air to pass over the inflamed surfaces, thus relieving the pain. Hence, to inhale cold air through the mouth would probably be more effective still—it is left to the reader to burn his mouth and try the experiment.

That the Sweet Fluid found in Flowers and taken by Bees is Honey

"Many people think that the honey they eat is just in the same state as it is in the nectaries of the flowers from which it has been gathered, but now you will know that this is not so. The reason that honey is good for us is that it has already been partly digested by the bees, and therefore our stomach is saved a certain amount of work."—p. 80, *Bees shown to the Children*, Ellison Hawks.

When a bee visits a flower she sucks up the nectar into her honey-sac and while it is in there some juices from glands in the bee's body are added to it, causing the cane sugar of the nectar to change into grape sugar.

That the Diet of a Nursing Mother should be much increased above her normal amount

"It is a mistake to suppose that a very large extra quantity of food should be taken and it is especially undesirable to take it too frequently: this often overloads and overtaxes the stomach and brings on indigestion. . . . Alcoholic liquors, as beer, porter, &c., are not only not required, but are injurious to mother and child."—*Medical Temperance Dictionary*, p. 51, J. J. Ridge, B.A., M.D., B.Sc.

"It is common practice to cram a wet-nurse with food, and to give her strong ale to drink, to make good nourishing and plentiful milk! This practice is absurd. The mother, or wet-nurse, by using those means most conducive to her own health, will best advance the interest of her little charge. . . . It is customary for a wet-nurse to make a hearty luncheon; of this I do not approve. . . . It is a common remark that, 'a mother who is suckling may eat anything.' I do not agree with this opinion."—*Advice to a Mother*, p. 39, Pye Henry Chavasse, F.R.C.S.

That any Water may be rendered fit for Human Consumption by Suitable Filtration

The water supplied to London is filtered through about 3 feet of sand by downward filtration, but it is not the sand which is of much importance where bacteria or disease germs are concerned. These micro-organisms are so small that they would pass through the interstices of the finest sand with the greatest of ease. Fortunately, however, a thin slime forms on the top surface of the sand of a filter and the disease and other germs are arrested by this slime. This slime forms naturally after the filter has been in use a short while, but sometimes it is produced artificially, *e.g.*, the filters of Col. Horrock's military water carts, which were used by the British Expeditionary Force, are formed of three layers of very fine canvas or sail-cloth, and on the outer surface of the outer layer a thin coating of slime is produced by mixing a small quantity of alum and chloride of lime with the water to be filtered. But suppose that instead of, or in addition

to, bacterial impurities, there are deleterious substances *in solution, e.g.,* poisonous metallic salts, then no amount of filtration will remove the matter in solution and consequently the water will remain unfit for consumption.

That all Water obtained from Deep Wells is fit for Human Consumption, especially if it is " as clear as crystal "

Technically a " deep " well is not necessarily a deep well! The technical meaning of a deep well is one the whole of the upper portion of which passes through a layer of clay and the lower portion of which enters the water bearing strata. A shallow or surface well, on the other hand, may be deeper than a " deep " well and is one which does not pass through such a layer of clay. The vital difference is that the layer of clay (which is water tight) prevents surface water, which is almost always polluted, from entering the well. Consequently, water from a " deep " well is more likely to be safe than water from a surface well, but the mere depth of either type does not of itself make the water good. Again some water may be slightly discoloured and yet be free from disease germs, while other may be " as clear as crystal " and yet be badly polluted by such germs or matter in solution. There is only one way of being sure of water and that is to have it examined periodically both chemically and bacteriologically.

That Standing Water is necessarily Bad to Drink

" You must not think that water that has been standing for any length of time will give you typhoid fever. The fact is that the best method we know of to purify water is simply to let it stand. This method is used in the great city of old London to-day. The old sailing captains knew it and they would take water on their ships, any kind of water, and kept it standing two or three months. They knew that allowing the water to stand purified it."—Dr. H. W. Hill, London, Ontario, Nov. 4, 1915.

" The practical hygienist has to consider under what conditions water can be kept fit for drinking purposes, and by what means it can be most readily and safely distributed to those who use it. He has to remember that water at rest containing organic matter, and exposed to the hot rays of the sun, soon teems with organisms that may or may not be perfectly harmless ; he has to bear in mind the nature

of the ground from which water is collected, whether it comes from cultivated areas or from regions in which there is sewage of any kind ; for upon these factors depends the absence or presence of bacteria from the water supply."—Dr. Sims Woodhead, *Bacteria and their Products*, p. 20.

It is the more remarkable that Dr. Woodhead refers to water containing organic matter, whereas the heading to this article is intended to refer to water fit for drinking before it was allowed to stand, and protected from contamination while so standing.

That the Turnipy Taste which Butter sometimes has is due to the Cows having Eaten Turnips or Swedes

Dr. W. E. Carnegie Dickson, M.D., B.Sc., F.R.C.P.Edin., deals in his little book on *Bacteriology* with the bacteriology of butter making, and at p. 92 says, " As yet even a rudimentary knowledge of these important facts is not within the range of an ordinary dairy-farmer's education ! The scientific dairyman should also know of the existence of starters of a hurtful type, which lead to the production of butter having a rancid, bitter, oily, or otherwise objectionable taste. At present he explains to the unsuspecting public that the ' turnipy taste ' of his butter is inevitable, as the cows are being fed upon turnips, instead of informing them that the taste is really due to organisms, especially of the *Bacilus coli* type, which are inoculated into the milk and cream from cow-dung and other even more objectionable sources."

That to Preserve the Green Colour of Green Vegetables they should be Boiled with the Lid off the Saucepan

Inquire Within Upon Everything, p. 214, " Put on your pot, make it boil, put a little salt in, and skim it perfectly clean before you put in the greens, &c., which should not be put in till the water boils briskly ; the quicker they boil the greener they will be. When the vegetables sink they are generally done enough, if the water has been kept constantly boiling. Take them up immediately, or they will lose their colour and goodness."

At p. 104 of his *Food and Feeding*, Sir Henry Thompson, F.R.C.S., says, " Garden peas, *petits pois*, when young, quickly grown, and fresh, have a delicious characteristic flavour of their own, are rather sweet, and almost crisp when

eaten, and maintain these attributes unimpaired, if simply boiled in salt and water."

The author made the following experiment : Four aluminium saucepans were used. Each contained cold water and one cabbage leaf, one parsnip leaf and one turnip leaf. Two were provided with lids and two had no lids. Of those with lids one had a little bicarbonate of soda added to the water. Of the two without lids one had some bicarbonate of soda. All four were placed on a gas stove, and in 10 mins. all started to boil, and were kept boiling for 30 mins. It was then found that those two with bicarbonate of soda had kept a bright green colour (in spite of starting with cold water), while the two without bicarbonate were browny-green, that which had been boiled without the lid on the saucepan being slightly less brown than that with the lid on. From this experiment it is clear that the use of bicarbonate of soda is far more effective in preserving the colour than removing the lid, and that when bicarbonate is used the effect of the lid is nil, though to keep the lid on saves heat and waste of water. So far, so good, but a paragraph appeared in the *Daily Mail* of Mar. 10, 1919, stating that " on no account should soda be added to the water," but this need not cause trouble, for according to Sir Henry Thompson, and *Inquire Within*, common salt, which is cheaper than bicarbonate of soda, should be used. Chemists also state that the water in which vegetables have been boiled contains important salts from the vegetables, and that consequently it should be used for making soup.

To sum up, use common salt, start with boiling water, and keep the lid *on*.

That if Tea-leaves are kept more than 15 Minutes in Hot Water, a lot more Tannin is Extracted from them

Doubtless, to produce the best tea the water should be left in contact with the leaves for little more than five minutes. The tea should then be poured off, or the leaves removed by means of a sufficiently large container, such as some tea-pots are provided with. But this is an expensive way of making the popular beverage. Use the water *immediately* it boils.

The dry tea contains a much larger percentage of tannin (= tannic acid) than is generally realised, the quantity being no less than about 15 per cent. or even 18 per cent. in the case of green tea.

Tannin is very soluble in water, the solubility being one

in one ; that is one ounce of water will dissolve one ounce of tannic acid. Hence, practically all the tannin is extracted from the leaves in 10 or 15 mins., and, therefore, as far as the tannin is concerned, it does not matter how long the tea has stood, but other and less soluble substances continue to be extracted, and it is these which make tea which has stood a long while on the leaves less palatable.

Tea without tannin would lose much of its characteristic flavour, and in this respect would resemble alcoholic liquors with the alcohol.

That Wine Kept in Glass Bottles becomes Stronger with Age

By the "strength" of a wine is usually meant its alcoholic strength, *i.e.*, wine which contains a large percentage of alcohol is called a strong or "heady" wine. Now, the alcohol in wine is produced by the fermentation of the sugar in the grape juice, from which wine is made, the fermentation being caused by yeast, which is a low form of vegetable life, and when the quantity of alcohol thus produced has reached a certain percentage it prevents more being formed, as the yeast plant cannot live in a liquid containing more than a certain percentage of alcohol. But bottled wines do not normally ferment after being bottled. The process of fermentation has taken place before and been stopped. Hence, being hermetically sealed in a glass bottle, the wine can neither gain nor lose alcohol. Nor can it lose water, which, if it were possible, would have the effect of making the remainder stronger. If the conditions were such that water could evaporate from the wine, then the alcohol would evaporate also, and as the latter is more volatile than the former, the loss of alcohol would be the greater, and the wine left behind would be weaker, not stronger.

That Brown Eggs are more Nutritious than White Ones

Mr. Donald Gunn wrote on Sept. 25, 1919 :—

"There is no difference in the nutritive value of the two kinds ; the contents of one egg are as good as those of another for purposes of nutrition, and they are all specially designed for the developing chick as containing the maximum of nourishment in the minimum of space. And the young of a bird laying white eggs needs neither more nor less nutriment than the young of one laying coloured eggs of an equal weight. Moreover, the colour—be it a uniform brown tint

as with the partridge or an elaborate black and green fantasy like the guillemot's, is only a surface pattern laid on by the bird *for its own purposes* as the last of the many stages in egg-making and long after the contents of the shell, and even the shell itself, are completed. To quote from a label in the Natural History Museum, ' The chemical composition of all eggs appears to be the same . . . The coloration of the shell has no relation to the ' richness ' of the egg.' "

That the Canning of Fruit in Tins is Dangerous

In a review of Canning and Bottling, by Dr. H. P. Goodrich, *Nature*, Oct. 10, 1918, states, " The fear of tin and of ptomaine poisoning, which has prevented some people from canning vegetables, is shown to be entirely groundless."

That Food to be Digestible and Nourishing must be Palatable

" Unpalatable Food.

" In the United States of America alcohol has been suppressed, tobacco is threatened, and now an attack is being made on the remaining pleasures of the palate. Three pestilent physiologists of the Jefferson Medical College, Philadelphia, have conducted experiments with the object of determining whether or no the human body derived less nutriment from food unpalatably served than from the same food palatably served. The ignoble inquiry was carried out with the exact methods of the laboratory. For seven days the unhappy subjects were placed on a uniform diet served palatably and amid pleasant surroundings. The exact proportion of the nutrient constituents of the food retained by the body was ascertained. Then followed a two-day period during which the same diet was served in an unpalatable condition amid dirty and unpleasant surroundings. The meat, biscuits, jelly, cornflour, pudding, and so forth, used for each meal were stirred together in a large flat porcelain trough, the dish itself and the beaker used for drinking having been smeared with animal charcoal. The table was dirty and strewn with dirty dishes, and an offensive chemical substance was smeared on the floor. The subjects were not told the constituents of the mess put before them, and one of them even failed to retain a meal after he had eaten it. But it was found that the digestive organs were not dainty. If they could be cajoled into making the effort, they retained for the needs of the body almost as

much from the dirty food as from the clean food. In the one case 85·7 per cent. of the nutrient constituents was absorbed, in the other 86·7. This, say the professors, should be good news to millions of people who eat unpalatable food in untidy surroundings. It should be bad news for everyone else except those incompetent cooks who will now have a new excuse for their carelessness. But even if the results of the experiments be confirmed, we decline to accept the inference. We know already that the human stomach is a hardy mixer. We rejoice that its walls are not transparent, and have no wish to be reminded that it is indifferent to those æsthetic refinements with which we tempt the appetite."—*The Times*, Apr. 28, 1920.

That Covering Milk makes it go Sour.

To keep flies out of the milk and yet comply with the idea that the air should not be kept from milk or it will turn sour, a muslin cover is often used in milk shops.

The National Clean Milk Society of 3, Bedford Square, W.C. 1, issue a penny illustrated leaflet, *The Care of Milk in the Home*, which shows a jug of milk standing in a basin of water, the jug being covered by an inverted bowl. The other shows a bottle of milk standing in water and covered by an inverted glass jam jar. If the jam jar is sufficiently long for its rim to be slightly below the water level, so much the better. On this leaflet we find, "The Housewife's Motto for Milk should be—Clean, Cool, Covered." . . . Stand the milk jug, bottle or basin in a basin of cold water and cover it with a plate put upside down. Muslin lets in dust and bacteria.

That Sugar Loses Weight Even When Stored in a Tin.

On Feb. 24, 1914, 2 lb. of white granulated sugar was put into a cylindrical tin with a tight-fitting lid, and left in the kitchen (*i.e.*, in a warm place) till May 24, 1914, when it was found to be exactly 2 lb. still.

That Green Sweets are Poisonous.

The pigment known as Schweinfurt green, a double metarsenite and acetate of copper, used to be used in the manufacture of green wall paper (*q.v.*), and this fact may have given rise to the idea that all green pigments necessarily contain arsenic. The arsenic salts are exceedingly poisonous, so we

may be sure that if green sweets were coloured with it there would be no slump in the business of undertakers—who, by the by, are men who always *carry out* what they undertake! The green of fruit and vegetables is due to chlorophyll, and has no arsenic in it.

That Drinking Hot Tea Cools the Person who Drinks it.

This is one of the dangerous fallacies, for if anyone during a heat-wave drank hot tea in the belief that it would lower their temperature, it might be the last straw, or rather thermal unit, and cause heat-stroke. As regards our feelings, heat is very much a matter of relativity, so that by taking in more heat by drinking hot tea and then cooling down to the same temperature as we were before we took the tea we may seem to be cooler. Cold water absorbs heat when we drink it, as its temperature has to be raised in our system from, say, 60° F. to 98½° F., the blood temperature. Hence the drinking of half a pint of water at 60° F. absorbs $\frac{5}{8} \times 38\frac{1}{2} = 24$ British thermal units, a considerable quantity of heat.

That it is advisable Not to Quench your Thirst in Hot Weather.

Another dangerous fallacy which Dr. Leonard Williams "nailed to the counter" in the *Evening Standard*, May 25, 1922. The only ways our bodies can get rid of excess heat is by radiation and conduction from the skin to the air, and by the evaporation of perspiration from the skin, the latter accounting for most of the cooling. Every pound of perspiration evaporated from our skin absorbs 1,036 British thermal units of heat. Hence to get rid of the excess of heat in hot weather we must perspire freely, and for this purpose must drink larger quantities of fluid. For a few days at Luxor, Egypt, in August, 1913, the author and a friend could not get a sufficient quantity of safe liquid to drink, and as the temperature was 106° F. in the shade during the day, and 100° F. at midnight, the position was serious, especially as the high temperature at night threatened to prevent sleep, and our blood temperature was 100° F., instead of 98½° F. By wetting thin merino shirts, and bath towels, and using these as night attire, we slept in comfort until they got dry, about half-way through the night, when we wetted them again, and again got to sleep. In the mornings, too, we started out with wet flannel shirts. Neither of us felt the slightest ill-effect from this. It is more likely we should have suffered some serious ill if we had not dissipated heat in that manner.

FALLACIES CONNECTED WITH OURSELVES.

(a) OUR BODIES

That a Man has One Rib Fewer than a Woman

This fallacy has no doubt arisen from the account of the Creation given in Gen. ii., 21 and 22, and those who state it are not clear whether it is on the right or left side that a man is one rib short. In the Natural History Museum, South Kensington, there are two normal skeletons (of a man and woman) side by side, and it will be found (much to the humiliation of the New Woman) that the man, as well as the woman, has twelve pairs of ribs.

A wag has said that though a man has the same number of ribs as a woman, he has less tongue.

It is not a fallacy that we are taller in the morning than in the evening, for the discs of cartilage between the vertebræ (24) of the backbone yield considerably to the pressure due to the weight of the body, when it is erect, and expand themselves while the body is in a recumbent position. This effect may amount to as much as half an inch in the case of a heavy man of, say, 5 ft. 10 in. in height.

That a Body Floats as Soon as the Gall Breaks

Sir Thomas Browne, M.D. (*Vulgar Errors*), experimented on this subject and reports on the results thus, "That the breaking of the gall is not the cause hereof, experience hath informed us. For opening the abdomen, and taking out the gall in cats and mice they did notwithstanding arise. And because we had read in Rhodiginus of a tyrant, who to prevent the emergency of murdered bodies, did use to cut off their lungs, and found men's minds possessed with this reason, we committed some unto the water without lungs, which notwithstanding floated with the others; and to complete the experiment, although we took out the guts and bladder, and also perforated the cranium, yet would they arise, though in a longer time."

The cause of a body rising is not the breaking of the gall, the reason is that the body becomes less dense (or "lighter,"

as it would be popularly expressed) than the water, owing to the generation of gas within it as putrefaction proceeds.

Hence a body will float sooner in warm than in cold weather.

That the Human Heart is in the Left Side of the Thorax

Sir Thomas Browne, M.D. (*Vulgar Errors*, Bk. IV., Chap. 2), says, " That the heart is seated on the left side is an asseveration, which, strictly taken, is reputable by inspection, whereby it appears the base and centre thereof is in the midst of the chest. True it is that the mucro, or point thereof, inclineth to the left, for by this position it giveth way unto the ascension of the midriff, and by reason of the hollow vein could not commodiously deflect unto the right. From which diversion, nevertheless, we cannot so properly say 'tis placed in the left, as that it consisteth in the middle, that is, where its centre riseth ; . . . The ground of this mistake is a general observation from the pulse or motion of the heart, which is more sensible on this side ; . . . "

The most muscular chamber, the left ventricle, of the heart is on the left side of the heart ; the largest artery—the aorta—arches over to the left (to the right in birds and reptiles), and the point is directed towards the left ; these facts make the beating of the heart more readily felt on the left side, but a median vertical plane through the breast-bone would cut off the larger portion of the heart on the right side.

That a Man Does not Weigh More After Dinner than Before

This fallacy has probably arisen from the fact that a man after eating and drinking, say, 2 lb. of food, does not weigh quite 2 lb. more than he did just before beginning to eat. This is due to the body continually losing weight, whether one is eating or not, but especially when doing violent exercise, by perspiration through the skin, and by the moisture and carbon dioxide gas exhaled from the lungs.

The increase in weight is readily shown by good scales ; and at the Constitutional, Conservative and Automobile Clubs they have weighing machines and books in which members can register their weights before and after meals. These records invariably show an increase as the result of eating. A member of the Constitutional Club kindly copied a few of these entries for the author, and these give $2\frac{1}{4}$ lb. as

the mean increase due to dining; the mean weight of the men before dining being twelve stones.

One reason given for the popular belief is that eating expands the person, who thus displaces more air and therefore weighs less! The expansion would have this tendency, but the food taken in is much heavier than the volume of air it displaces. If after every meal you weighed less, in time, you would weigh nothing, "which is absurd," as Euclid used to say.

A man whose mean weight was 12 st. 12 lb. increased 1 lb. 13 oz. (mean of 4) through having had lunch, and the same individual increased 2 lb. 14 oz. when he had dinner.

Dr. Eric Pritchard lectured under the auspices of the National Health Society on Nov. 1, 1907, and from the report of this lecture (*Daily Mail*, Nov. 2, 1907) we extract the following:—

"Dr. Pritchard's idea in weighing the infant was to prove, practically, a theory anent nutrition. The baby's weight, which was exactly 20 lb., was carefully registered. Whereupon Dr. Pritchard called for the mother of the baby. She came upon the platform, smilingly, and took the child into her arms, subsequently feeding it. Then the infant was once more brought forward and again weighed, when it was seen that it had, as a result of the recent nourishment, gained just 4 oz. in weight.

"Dr. Pritchard then proceeded to emphasise the importance of this 'weighing test.' He advised that the weight of all infants should be registered before and after feeding, because by such a method it was possible to gauge precisely the amount of nourishment which the child was taking."

If there is any reader still sceptical on the subject, we beg leave to refer him or her to Prof. Huxley's *Lessons in Elementary Physiology*, p. 4; and the author may add that he has on several occasions weighed himself before and after a meal, and in all cases his weight increased. He has also weighed himself before and after a Turkish bath, and this showed a loss of $1\frac{3}{4}$ lb. on 12 st. 3 lb.

Mr. J. S. Udal, F.S.A., writing in *Notes and Queries*, Sept. 25, 1915, p. 249, stated, "I have recently made the *experimentum in corpore vili*, and after a moderate luncheon of soup, toast, biscuits, and cheese, supplemented by half a pint of cider, I have found in my own case an increase of weight of about $1\frac{1}{2}$ lb."

In some dining places in America it is said the patrons are weighed before and after dining *and pay in proportion to their gain in weight!*

That a Ventriloquist Talks in his Stomach

The etymology of this word has a great deal to answer for, as it no doubt keeps the popular idea alive. Certain animals, to wit the lobster and crayfish, have teeth in their stomachs; but, as far as we know, they do not possess the power of producing audible sound by means of those organs.

On this subject Prof. Huxley, F.R.S., says:—"What is called *ventriloquism* (speaking from the belly), and is not uncommonly ascribed to a mysterious power of producing voice somewhere else than in the larynx, depends entirely upon the accuracy with which the performer can simulate sounds of a particular character, and upon the skill with which he can suggest a belief in the existence of the causes of these sounds.

[To aid him in this he keeps his lips as motionless as possible, and employs lay figures, which are sometimes life-like, and other suitable "properties."—Author.]

"Thus, if the ventriloquist desires to create the belief that a voice issues from the bowels of the earth, he imitates with great accuracy the tones of such a half-stifled voice, and suggests the existence of someone muttering it by directing his answers and gestures towards the ground. These gestures and tones are such as would be produced by a given cause; and no other cause being apparent, the mind of the bystander insensibly judges the suggested cause to exist."

That it is the Right Thing to Shut One Eye when Looking Through a Microscope or Telescope

Almost any book on the microscope will tell you this is wrong, for it is more tiring to the eyes, especially—as is usual with those who do it—if the fingers be pressed over the eye that is not in use.

We quote from Dr. F. O. Bower, F.R.S., *Practical Botany*, p. 14:—"Observers should accustom themselves to using both eyes indifferently, and when one eye is being used for observation, *the other should be kept open;* a little practice will soon overcome any difficulty which may be at first found

in doing this." It *is* more awkward the first hour or two, when one has been in the habit of doing wrongly, but the comfort obtained when one has become used to the right method is well worth the effort. We may notice, too, that little children, who have never seen a microscope used before, naturally keep both eyes open. This is not the only thing which children do naturally the right or logical way, but owing to their being surrounded by so many illogical and inconsistent practices this valuable faculty is soon lost.

That Comparative Anatomy shows that the Human Teeth and Intestines are Constructed with a view to the Digestion of Flesh, and not Vegetables.

Comparative anatomy establishes without a doubt the frugivorous, and not the carnivorous, origin of man.

" The natural food of man," says Cuvier, " judging from his structure, appears to consist principally of the fruits, roots, and other succulent parts of vegetables." This opinion is corroborated by that of Linnæus, Gassendi, Ray and Owen ; and Sir Henry Thompson, F.R.C.S., says in his *Food and Feeding*, p. 18 : " Any evidence to be found by anatomical investigation can only be safely regarded as showing what man is and has been. Thus the characters of his teeth and digestive organs indicate that during his long history of development he has mainly lived on roots, seeds, nuts and fruits ; in other words, he has been a vegetable feeder."

The assertion so often made that alcohol and animals are " sent " us as food is absurd. The mere fact that we have been accustomed to eat flesh-food no more proves that animals were created for this purpose than the existence of cannibalism proves that missionaries are " sent " to the South Sea Islanders solely as an article of food, or the former existence of slavery that black men were " sent " to be the slaves of the white.

That a Person Falling from a Great Height (say 200 feet) is Dead Before he Reaches the Bottom

If the above were not a fallacy, then the Irishman's statement that, " It is not the fall that hurts, but it is the *sudden stop*," would be incorrect.

There are many instances on record of people falling 50 feet or more with little or no ill-effect. Mr. Ernest Benedict, M.I.C.E., re-told the writer in 1909 that about the year 1856

a " gin ' boy fell down a tunnel shaft (on one of the Great Western Railway Company's lines) some 250 feet deep, and called out " Below " three times on his way down, though needless to say, the poor fellow, who so unselfishly thought of warning his mates to get out of the way, was killed. Mr. Benedict got the information from Charles Richardson, the first pupil of Isambard Kingdom Brunel, the celebrated engineer. Mr. Benedict was I. K. Brunel's last pupil, and joined Richardson in 1858. There is a case on record of a servant girl falling from Clifton Suspension Bridge in May, 1885, and not being killed ; in fact, she was alive still in 1909. In this case, no doubt, her clothing acted as a kind of parachute ; but still the maximum velocity attained must have been very great, for the fall was about 250 feet.

On September 18, 1896, a man threw his two children, aged three and twelve, from the same bridge. A boat was passing at the time, and the boatman saved the children, who were but slightly injured by their terrible fall. Their names were Elsie and Ruby Brown. Then, again, we have the instances of professional divers (*e.g.*, the man who used to perform at the Royal Aquarium), and acrobats, such as one of the Hanlon brothers, who used to dive from the roof of Olympia into a net below. Also Baldwin, the intrepid parachutist, though, of course, his downward career (no offence intended !) used to be checked by the parachute ; but before this was fully open, the velocity must have been considerable.

We have the case of a train travelling at 60 miles per hour (*i.e.*, 88 feet per second) ; we presume no one believes that it would kill a person to put his or her head out of the carriage window when travelling at the above rate ; and yet 88 feet per second is the maximum velocity one could attain in falling from a height of 120 feet. There are also now the hundreds of cases of pilots of aeroplanes who have travelled for several hours at speeds of well over 100 miles per hour.

In some cases of persons with weak hearts, it may have happened that the *shock* of feeling themselves falling has caused so great an increase in the pressure of the blood in the heart that it has ruptured that organ ; for the shock causes all the muscles to contract violently, the muscles compress the blood-vessels, and thus the blood is driven towards the heart.

The idea seems to be that it is impossible to breathe while falling rapidly, and that the time taken in falling is longer

than that for which we can do without breathing ; but we could fall nearly 400 feet (Nelson's Column in Trafalgar Square, London, is about 160 ft. high) in five seconds, and we can hold our breath quite comfortably for 60 seconds !

" A remarkable escape from a terrible death occurred near Dover yesterday, when a lad about fifteen years of age fell over Abbott's cliff, which is 415 ft. high. A lady and gentleman were walking along the cliffs towards Folkestone with their son, when they suddenly missed him, and it became apparent that he had fallen over the cliff. Assistance was ultimately obtained from the coastguard station at Lydden Spout, and a search party mustered. The boy was found on a ledge of loose earth which had arrested his fall in the most remarkable way about half-way down the cliff, and was rescued by coast-guard Doolin, who was lowered down the face of the cliff by means of ropes. Except a severe shock and a few bruises the boy escaped serious injury."—*Daily Chronicle*, Sept. 11, 1897.

In the *Pittsburg Dispatch* of Mar. 12, 1916, there was a long account of " How Minnie Werner fell 16 storeys," or nearly 200 ft., and was saved by falling on to a motor lorry full of empty cardboard boxes, sustaining only " a few broken bones and slight internal injuries." She remained conscious through the whole fall, which must have taken about four seconds, and her speed on reaching the boxes must have been about 100 ft. a second.

The late Mr. W. T. Douglass, M.I.C.E. (*b.* Mar. 23, 1857), was assistant engineer on the erection of the Eddystone light-house, his father, Sir James N. Douglass, being the engineer. When the full height had been reached Mr. W. T. Douglass was knocked off the top by the crane, and was falling on to the rocks below, when a big wave washed over them, and he fell into this, his life thus being saved. He was drowned many years after, on Aug. 10, 1913, by the capsizing of a small sailing boat off Start Point. Vide *Proc. Inst. Civil Engineers*, last Vol. of 1914, and *Page's Weekly*, p. 1,306, Dec. 14, 1906.

The *Lancet* in Oct., 1910, had an article on non-fatal falls from great heights.

That a Man has Seven Skins, and that Prince Leopold and the Duke of Clarence had only Five Skins Each !

A much enlarged section through human skin is usually given in works on human physiology. From such representation in section it is seen that while the structure of skin is not the

same throughout its whole thickness, it is certainly not divided up into distinct layers. Physiologists recognise at most two layers, which, together, make up the skin. This is a different thing from saying there are two skins. The outer of these layers is called the epidermis, which is comparatively dry and senseless, and acts as a protection for the inner layer, the dermis, or true skin as it is sometimes called.

That if a Man has a Tendency to become Bald he should shave off his Beard, as the latter abstracts some of the Nourishment from the Hair of the Head.

Dr. Gustav Jaeger refers to this fallacy at p. 41 of *Health Culture* (1897). We have consulted Quain's *Dictionary of Medicine* (1902), and can find no support there for the belief, though the subjects of hair and baldness are fully dealt with.

That a Drowning Person always Rises to the Surface Three Times Before Finally Sinking

"Like a drowned man, a fool, and a madman: one draught above heat makes him a fool; the second mads him; and a third drowns him."—Twelfth Night, I., y., 130.

Dr. H. D. Littlejohn deals with the subject of drowning in the *Ency. Brit.*, and we have abstracted the following from his long article :—

"The drowning individual struggles to reach the surface of the water in his efforts to respire; and as he does so he draws water into his windpipe which provokes coughing. This expels the air from his lungs, and the water which threatened to suffocate him; and as he sinks, in his struggles he endeavours again to respire, but now draws water into his mouth which chokes him, and which can only be got rid of by swallowing. Insensibility then comes on, and death rapidly but placidly ensues from a true asphyxia."

There is not a word in the quotation or the whole article which says or implies that the unfortunate person ever rises three times before dying.

On referring to Quain's *Dictionary of Medicine*, we find the article "Death by Drowning" is by Prof. J. Dixon Mann, M.D., F.R.C.P., and in it he says :—"The specific gravity of the human body is slightly greater than that of water, so that an individual who falls into deep water tends to sink. The involuntary movements of the limbs, made in attempts at self-rescue, are sufficient, however, to bring

the body, at least momentarily, to the surface, when air along with water is forcibly drawn into the lungs. Sooner or later, according to the strength and natatory power of the victim, the body is again submerged. In fatal cases *this alternation may be repeated several times before the body finally sinks.*" The italics are ours. Here, though the rising and falling are specifically referred to, there is no suggestion that the phenomenon occurs exactly three times, no more and no fewer.

The first sentence of this quotation seems to need explanation. By "human body," we understand the naked human body in its normal condition, *i.e.*, with a certain quantity of air in the lungs, air-passages, and other parts. In this condition we maintain that the specific gravity of the naked human body is *just less than* that of fresh water, and consequently still less than that of sea-water, and that this is so is easily demonstrated in a freshwater swimming-bath, or at the seaside, by those who can float "without moving a hair," as the expression is, *i.e.*, by lying straight out with the arms above the head and in line with the rest of the body and legs, and the head well in the water. This may be done either on the back or on the abdomen; but, of course, in the latter case the experimenter cannot breathe! When this floating is done on the back in sea-water, the face and upper part of the chest remain out of the water, and it is easy to breathe when the water is smooth; but when only slightly rough, the little waves have an unpleasant trick of just washing over one's face and into the nostrils.

The author has not tried this method of floating when fully attired; but, in all probability in that case, especially owing to the weight of boots and coins and other things in pockets, the specific gravity of the whole would be greater than that of water, and hence the body would sink.

In the *Harmsworth Ency.*, IV., 71, under "Rescue of the Drowning," we find, "Do not act on the popular idea that a drowning man comes to the surface three times; it is not true."

When we consider the dangers that people who cannot swim are to themselves *and to others*, who frequently have to risk their lives in saving or attempting to save them from drowning, it is a wonder and a pity that there is not compulsory teaching of swimming, just as there is compulsory education in other subjects.

Contrary to the ideas of many non-swimmers, the rescuing of a drowning person is a very arduous and dangerous operation, and only likely to be successful when undertaken by cool-headed and powerful swimmers.

That a Caul Prevents its Possessor from being Drowned.

This is one of the ultra preposterous fallacies which might have been omitted with numbers of the same family which we have omitted, but it is still so popular, and advertisements offering to sell cauls have appeared in the daily Press, that we decided to include it.

" To gentlemen of the Navy and others going long voyages to sea. To be disposed of, a child's caul. Enquire at the Bartlet Buildings Coffee House in Holborn. N.B.—To avoid unnecessary trouble, the price is twenty guineas."—*Morning Post*, Aug, 21, 1779.

" A child's caul. Price six guineas. Apply at the Bar of the Town Shades, corner of Tower Street. The above article for which fifteen pounds was originally paid was afloat with its late owner thirty years in all the perils of a seaman's life, and the owner died at last at the place of his birth."—*The Times*, May 8, 1848.

Although, apparently, a caul is now supposed only to prevent drowning, it was comparatively recently supposed to betoken great prosperity for the person born with it, as well as to be able to impart the gift of eloquence. It was also thought that no vessel with one on board could be lost. Ben Jonson says in the *Alchemist* (1610), Act I., Scene I: " You were born with a caul on your head " ; and it is referred to at p. 7 of *Choice Notes from Notes and Queries* (1859).

The *Daily Mail*, Jan. 19, 1899, had the following quotation from *The Lancet*:—" We believe that there is still some market for cauls among sailors, who retain their belief in the efficacy of the membranes as a protection against shipwreck and drowning. Notices of ' Cauls for sale within ' were to be seen recently in windows in the vicinity of the docks both of London and Liverpool, but it is some time since we have noticed an advertisement of a caul for sale in the daily Press. It may be remarked that the sale of cauls so far from being a very ancient custom is a comparatively modern innovation. The witchcraft of the Middle Ages declared against the caul retaining any virtue whatever

if parted with by gift or sale to any but a member of the child's kindred."

The writer regrets to record that he had an aunt by marriage who always carried a caul with her when she travelled abroad.

In the *Daily Express* of Aug. 23, 1904, there was this advertisement :—" Child's Caul for sale (male) ; £3. Apply 1, New Street, Lymington, Hants."

The author duly applied, and inquired the use of the said caul, receiving the following reply dated Aug. 29, 1904 :—" Dear Sir or Madam,—I advertised the caul for sale as it is supposed if a person goes to sea and wears it, they never get drowned. They are very rare, and, as a rule, captains, sailors, or anyone will give a good price to get one. I was offered £5 for it, and then I thought I should like to keep it, but I am in need of money, and advertised it for £3. I have been in correspondence with a gentleman, but I have had no definite answer. If you care to have it, it is at your disposal. Yours truly,——

" P.S.—It was born with a boy twin, one being enveloped in it."

The author was pleased to note that the writer used the word " supposed," and evidently she did not believe the myth herself.

The following three advertisements all appeared in the *Star* on December 20, 1895 :—

(1) Caul (Male), £3 or offer. 44, Whitworth Road, Plumstead, Kent.

(2) Caul (Male) ; no reasonable offer refused ; cash or kind. A. Kemp, Baggeholme Road, Lincoln.

(3) Child's Caul (Female) for sale ; what offer ? W., 2, Rutland Terrace, Tyne Estate, Ilford.

In August, 1915, Mr. Ed. Lovett, of the Folk-lore Soc., wrote to the editor of a London newspaper, stating that the danger of submarines had quickened the belief of sailors in the saving efficacy of cauls, and that he had seen a notice, on Aug. 26, 1915, of a caul on sale in a shop near the London Docks.

Sir Thomas Browne refers to this absurdity in Chap. XXIII., Sec. 15, of his fifth book of *Vulgar Errors*, and Mr. Simon Wilkin, his editor, has several notes of advertisements, *re* cauls, which appeared in *The Times* of about 1820. He

ends by saying, " Intellect, surely, was not yet in full march at this period."

In Browne's time a caul was called a silly-how, which suggests " how silly " were, and are, the ideas about a silly-how.—Vide *Notes and Queries*, Jan. 6, 20 and 27, 1923, pp. 9, 58 and 75 respectively.

That it is Bad to Drink Water Directly after Eating Fruit.

This idea used to be extremely popular at the Cape when the author was there nearly 40 years ago. He has inquired of a Wimpole Street physician (who was also formerly at the Cape), and cannot find that there is any truth in the belief, except the general one that it is not good to dilute the gastric juices too much after eating anything, and especially, of course, if the food be indigestible.

That it is a Bad Sign for a Child to be Born with a Tooth already Cut

" Teeth hadst thou in thy head when thou wast born,
To signify thou cam'st to bite the world."
Henry VI. (3), V., vi., 53.
[*See also* Richard III., II., iv., 28; and IV., iv., 46.]

Here the uncommonness of this event has struck the popular observation, and has been taken as unhealthy because it is unusual. Children who are born with teeth have usually been carried for a longer period than is normal, and, as a consequence, are delivered with difficulty. Hence, the tooth may be considered to indicate a past event, but not a future one.

That an Eight Months' Child Never Lives, though a Seven Months' One often does.

This idea is very old, as the following quotation from Sir Thomas Browne, M.D. (*Vulgar Errors*, Bk. IV., Chap. 12), shows, " And therefore Pythagoras, Hippocrates, Diocles, Avicenna and others, have set upon us numeral relations and temporal considerations in the womb; not only affirming the birth of the seventh month to be vital, that of the eighth mortal, but the progression thereto to be measured by rule, and to hold a proportion unto motion and formation."

A consulting physician of one of the children's hospitals in London, told the author that both eight and seven months' children are below the normal time, but that the probability of survival is in favour of the eight months' child.

Dr. J. B. Harrison says, " People say that a seven months' child is more likely to live than an eight months' child, but they cannot tell you why ; and how the idea arose it is difficult to say : A fondness for paradoxes may have had a share in it. Ramsbottom says this error is as old as Hippocrates."

The author, too, can find nothing in support of the usual statement in Dr. Pye Chavasse's well-known work.

That Children should be Lightly Clothed, with their Limbs Bare, so that they may become " hardened "

E. S. Reynolds, M.D. Lond., F.R.C.P., in his *Hygiene for Beginners*, says : " The practice based on this idea is a great mistake, and little short of cruelty. They should be covered almost entirely with a layer of fine woollen material, and the outer garments should be warm and light." Another physician says that, of course, a robust child may stand exposure which would kill a weakling. The Zulus make use of this method of sorting out the strong from the weak, for their new-born babes are plunged into cold water, and the weaklings are thus killed. Cruel as this treatment appears in our eyes (it must not be forgotten that African water is not quite so cold as water in England in mid-winter), it certainly has assisted to produce one of the finest races in the world from a physical point of view.

From p. 158 of the 16th edition of Pye Chavasse's classical work, *Advice to a Mother*, edited by T. D. Lister, M.D., we quote :—

" Do you advise a child to be *lightly* clad, in order that he may be hardened thereby ? No. It is an ascertained fact that more children of the poor die, who are thus lightly clad, than of those who are properly defended from the cold. Again, what holds good with a young plant is equally applicable to a young child ; and we all know that it is ridiculous to think of unnecessarily exposing a tender plant to harden it. If it were thus exposed, it would wither and die."

Herbert Spenser said, " We have met with none competent to form a judgment on the matter who do not strongly condemn the exposure of children's limbs. If there is one point above others in which ' pestilent ' custom ' should be ignored, it is this."

The *Daily Mail* of Jan. 27, 1914, had the following article on the subject : " The superstition that it is good to ' harden ' children by sending them out in all weather with bare legs

and flimsy clothing should receive its death warrant from the medical opinion which we print to-day. The practice may be an excellent one in such a climate as that of Sicily or Egypt, but it is altogether unsuited to a country that knows such strange vagaries of weather and temperature as our own. The doctors are unanimous that this exposure of the child's limbs makes invalids, not strong men.

" Parents, doubtless, err in good faith. Some of them may even cite the admitted fact that athletes benefit by exercising with the very minimum of clothing, as the Greeks of old knew and the French gymnastic teachers of to-day understand. But the inadequately clothed children in question are not always running about or playing games ; they are generally to be seen accompanying their mothers or their nurses at a leisurely walk. The poor do not err in this respect. Their usual mistake is to make of their offspring ambulant wardrobes. The real offenders are the well-to-do, and among these more particularly the votaries of what is humorously called ' the simple life.' "

" Why is it that mothers persist in exposing the largest possible amount of surface of their children to the cold, by the absurd style of dress they adopt, and then marvel at the peculiar dispensation of Providence, which removes their infants by bronchitis and gastric fever ? "—T. H. Huxley, M.B., F.R.S., *Lay Sermons, Essays and Reviews*, p. 77.

That Red Flannel is Warmer than White Flannel when Worn Next to the Skin and that it is a Sort of Remedy in itself.

This fallacy has evidently arisen on the doctrine of association—fire is hot and red, so is red-hot iron ; snow and ice are white and cold—hence the tendency is to think all red things are warm, and all white ones are cool. This is illustrated by the fact that we speak of " warm colours " (dark ones with a mixture of red) and " cold colours " (light colours, especially slate and stone colours). No doubt a further reason for the belief that white is necessarily cold, is the fact that in summer and hot climates, much white (exterior) clothing is worn. The reason for this is that white reflects the heat and light rays better than other colours. In the case of *under*-clothing this effect could not take place.

An objection to coloured underclothing is that the dye may come off, and give rise to some skin trouble.

T. J. Pettigrew, F.R.S. (p. 18, *Superstitions of Medicine and Surgery*), says, "The connection of the properties of substances with their colour is also an opinion of great antiquity: white was regarded as refrigerant, red as hot—hence cold and hot qualities were attributed to different medicines. This opinion led to serious errors in practice. Red flowers were given for disorders of the sanguiferous system, yellow ones for those of the biliary secretion, &c. We find that in smallpox red bed-coverings were employed, with the view of bringing the pustules to the surface of the body."

That children should not be allowed to walk as soon as they like

Dr. G. Eric Pritchard, M.A., M.D., M.R.C.P., speaking at the Child-Study Society, London, on Nov. 26, 1908, said it was a mistaken idea not to allow a child to walk as soon as it wished. Mr. Pye Chavasse, F.R.C.S., in his well-known *Advice to a Mother* (14th ed., p. 136), is very decided about the matter, and among other things says: "When he has the inclination and the strength [to walk], it will be folly to restrain him; if he has neither the inclination nor the strength, it will be absurd to urge him on." He goes on, however, to make it equally clear that the child *must not be put on his feet;* he must be left to get on them himself of his own accord, and then be allowed to walk as much as he will.

That it is Bad to Bathe in Cold Water when you are Hot

In answer to our inquiry, Mr. F. H. Lane, M.R.C.S., replied: "No; on the contrary, it is better to bathe when hot, than to wait till the body is cold." And from the instructions, issued by the Royal Humane Society, we quote the following:—

"Bathe when the body is warm, provided no time is lost in getting into the water.

"Avoid bathing when the body is cooling after perspiration."

The following letter appeared in the *Daily Mail*, of Jan. 21, 1907:—

"Sir,—In the *Daily Mail* report of the inquest on the sad death of the lady who was drowned in the Hampstead

Heath pond, one of the witnesses gave as a reason why he did not enter the water that he ' was hot.'

" May I point out that it is quite a mistake to think you should not enter the water when warm ; as a matter of fact, the opposite is the truth, and you should not wait to get cool.

" Alfred Rowley,
" Honorary Secretary of the
Serpentine Swimming Club."

In the case of Turkish baths, it is the usual practice to plunge while hot into a cold swimming bath, or to have a cold spray bath.

" I think some people have what may be called wrong notions with respect to cold bathing, I mean as to the state the body ought to be in when immersed in cold water. I have heard it stated that it is dangerous to go into cold water whilst the body is warm, but I should conceive it much more dangerous to go in cold. When the body, indeed, is in a profuse perspiration, it is improper to plunge into cold water, because in this state a kind of prostration or exhaustion may be supposed to exist which is not the best calculated to resist the cold. A dry warmth of the body, however, will best stand a shock of cold, and it may be incidentally observed that bathers should not remain in cold water long enough to experience a permanent chill."—J. B. Harrison, Surgeon, in *Cham. Edin. Jour.*, 1850, p. 414.

Some further information on this matter will be found in *Hours of Exercise in the Alps*, by Professor Tyndall, F.R.S.

That it is impossible to Open One's Eyes Under Water because the Eyelashes stick to the Eyeball

It is probably not advisable to open one's eyes under water because of the chill, the chance of the water being dirty, and the washing away of the natural fluid with which the eye is lubricated ; but any expert swimmer will testify not only to the possibility of doing so, but also to the fact that it can be done by most people without inconvenience or apparent ill effects. The experiment can be made easily in a large wash-hand basin full of tepid water. Anyone who has seen the natives of Madeira dive for coins thrown into the sea for them from passenger steamers cannot fail to recognise that the above is a fallacy. We believe, too, that pearl and sponge divers use their eyes under water. The

fallacy has probably arisen from noticing that the hairs of an artist's colour brush cling together when wet and not when dry. This is due to the surface tension of the water; but if the brush be held under water, the hairs will separate because there is no surface tension below the surface, and the water pressure acts equally all round each hair.

Prof. C. V. Boys, F.R.S., discusses this fallacy in his little book on *Soap Bubbles*, and Sir Thomas Browne, M.D., mentioned it at the end of Chap. 6 of Book IV. of his *Vulgar Errors*.

That Exercising the Body Rests the Mind

"To work my mind, when body's work's expired."
Shakespeare; Sonnet, XXVII.

In Nov., 1908, Dr. Toulouse, a French physician, published *How to Form a Mind*, and in this he attacks the above fallacy, saying that when the body gets tired the mind does not rest. To take a long walk after several hours of intellectual labour is simply adding one fatigue to another. He goes even so far as to say that no athlete was ever a genius, and that no intellectual person can be much of an athlete. "You cannot spend your vitality in two opposite directions."

Sir James Crichton Browne, M.D., F.R.S., speaking at a meeting of the British Child-study Society, London, on Oct. 29, 1908, said it was entirely wrong to think that in the case of body-fag and brain-fag the one would compensate for the other, while Dr. G. V. Poore, F.R.C.P. (*Quain's Dic. Med.*), defines fatigue as disability to perform *either* mental or physical work, and said, "General exhaustion is brought about by overwork, whether physical or mental." Dr. W. B. Drummond, M.B., C.M. (*Introduction to Child Study*, p. 174), says, "The fact that fatigue is not confined to our muscles is shown by our disinclination for work, involving concentration of thought. After prolonged mental exertion, on the other hand, we find refreshment in gentle outdoor exercise, but anything involving severe bodily effort would simply add to our fatigue." And (p. 188), "The point of importance is the fact that all fatigue is, at bottom, of one kind. . . . bodily exercise is not in any true sense a restorative after mental fatigue. It is true enough that a change of occupation does afford relief to the tired organs, but although local relief is thus given, the drain on the total store of energy still continues."

Mrs. Mary Scharlieb, M.D., M.S., lecturing to the Child Study Soc., London, on Jan. 26, 1911, also referred to the popular and mistaken idea.

That Girls are Naturally More Delicate than Boys

There seems to be no reason for believing this, in fact the exact opposite is more likely to be true, for it is well known that in the United Kingdom more boys than girls are born, yet there are more females than males in the country.

Newsholme (*Vital Statistics*) states that in the years 1891-5 female mortality was lower than male mortality at all ages, except from five years to twenty years, and only between the ages of ten years and fifteen years was the female slightly higher than the male mortality. During the school age (say from seven years to fifteen years) there is a tendency for the *sickness* rate to be slightly higher among girls than boys, but this is probably due to the boys getting much more outdoor exercise ; for owing to *the most harmful error* that girls do not require so much exercise as boys, their health suffers, though even with this handicap their mortality (taking all ages into account) is less than that of boys.

That Exercise is Unimportant for Girls

Dr. W. B. Drummond (*An Introduction to Child Study*, p. 170) says, " It cannot be too strongly impressed upon parents and teachers alike that outdoor exercise is every bit as important for girls as for boys. Without it girls cannot but grow up weakly and anæmic. The culture of the body is just as important as the culture of the mind, because it is important to the culture of the mind. '

Mr. Pye Chavasse, F.R.C.S. (*Advice to a Mother*, 14th ed., p. 281), " Girls and boys, especially the former, are too much confined within doors. It is imperatively necessary, if you wish them to be strong and healthy, that they should have plenty of fresh air and exercise. By exercise, I mean the free unrestrained use of their limbs. Girls, in this respect, are, unfortunately, worse off than boys, although they have similar muscles to develop, similar lungs that require fresh air, and similar nerves to be braced and strengthened. . . . The reason why so many young girls of the present day are so sallow, undersized, and ill-shaped, is for the want of air and exercise."

Sir Frederick Treves, in Quain's *Dic. of Medicine*, p. 1,241, states, " The physical condition of a large proportion of the

girls and women in this country is quite deplorable, especially among the middle and upper classes. . . . The girl is too often encouraged to be dull, to be prim, to be subdued, to suppress the outbursts of pure animal spirits. She is more or less under the curse of that detestable adjective, ' lady-like.'

" A good digestion and vigorous lungs are more useful to a woman in the battle of life than a knowledge of advanced mathematics ; . . . running, skipping, outdoor games, riding, skating, swimming, cricket, games with balls, archery, tennis, and certain exercises in the gymnasium. They should practise also such movements as develop the abdominal muscles, and should never neglect rowing. Cycling may be practised in moderation. Jumping is probably not advisable for girls who have passed the period of puberty."

That Twins are Almost Invariably Alike in Facial Appearance

Dr. W. B. Drummond (*An Introduction to Child Study*, p. 322) says, " It might be expected that twins would be found to have a general average resemblance to one another, and few greatly exceeding the average likeness, and a few markedly falling short of it. Sir Francis Galton's returns,* however, showed that this was not the case, but that extreme dissimilarity between twins of the same sex were nearly as common as moderate likeness. When the twins were a boy and a girl they were never closely alike."

That Alcoholic Liquors " Keep Out the Cold "

Prof. T. H. Huxley, LL.D., F.R.S. (*Lessons in Elementary Physiology*, p. 129), speaking of the capillaries in the skin, says, " . . . exudation from these vessels takes place more readily when the walls of the veins and arteries are relaxed, and the blood distends them and the capillaries. But the condition of the walls of the vessels depends upon the nerves by which they are supplied ; and it so happens that cold affects these nerves in such a manner as to give rise to contraction of the small vessels, while moderate warmth has the reverse effect.

" Thus the supply of blood to the surface is lessened, and loss of heat is thereby checked, when the external temperature is low ; while, when the external temperature is high, the supply of blood to the surface is increased, the

* *Inquiries into Human Faculty, 1883*, p. 216 *et seq.*

fluid exuded from the vessels pours out by the sweat-glands, and the evaporation of this fluid [perspiration] checks the rise in the temperature of the superficial blood."

The foregoing teaches us concerning one of the infinite number of beautiful provisions of Nature. Now alcohol prevents the contraction of the small vessels which should take place when the body is exposed to cold, consequently the supply of blood to the surface of the skin is larger than Nature intended it to be, and the blood is cooled by coming in contact with the outer layers of the skin which have been cooled by the cold atmosphere. Thus by the action of alcohol the body has lost more heat than it would have done if alcohol had not been taken. The cause of the popular idea that the body has been warmed by the action of alcohol is obvious, for the warm blood being allowed to enter the capillaries of the skin warms the nerves around the capillaries, and thus produces the sensation of warmth, but with the important distinction that heat is *passing out from* the body instead of entering it.

On May 4, 1905, Sir Frederick Treves, F.R.C.S., delivered an address to the Church of England Temperance Society and from the leader in the *Daily Mail* of May 5, we extract the following :—

" It is well Sir Frederick's speech should be carefully studied, as it will remove many popular delusions. Alcohol, he states, is neither an appetiser nor a digestive, and though it has stimulating qualities, these last for a very brief period, and leave behind them bad effects. . . . As to the effect of alcohol on the human physique, climbers have long since observed that the man who drinks is an indifferent mountaineer, while Sir Frederick adds the very interesting fact that on the march to Ladysmith ' the soldiers who were drinkers dropped out as if they were labelled.' Finally, he declares that the consumption of alcohol is inconsistent with fine work in any profession, affecting the steadiness both of the hand and brain. There could be no more crushing indictment of drink, yet this proceeds from a scientific man, who carefully weighs his phrases."

Sir Victor Horsley, F.R.S., F.R.C.S., M.B., B.S.Lond., speaking in Toronto, on Aug. 23, 1906, at a meeting in connection with the British Medical Association, said, " I would like to say that the profession at home has the same hostile attitude on the whole towards alcohol as you have, and I

will prove it to you. I mean alcohol not only as a beverage, which is indulged into too great an extent, but as a drug.

"The profession at home has found out what the real value of alcohol is as a drug, and that is, in my opinion at any rate, practically nil."

In *Alcohol and the Human Body*, Sir Victor Horsley and Mary D. Sturge, M.D.(Lond.), say (p. 167):—"Alcohol causes a slight paralysis of the nerves controlling the blood-vessels of the body, and, as a consequence, these dilate and permit of more blood entering each little tube. This dilation of the thousands of tiny vessels that course through the skin results in much of the blood in the body being able to reach the surface and become rapidly cooled . . . this occurs at the expense of the internal organs, and may, if excessive, lead to exhaustion and risk of life. . . ." (p. 168), "A party of engineers were surveying in the Sierra Nevada. They encamped at a great height above the sea-level, where the air was very cold, and they were miserable. Some of them drank a little whisky and felt less uncomfortable; some of them drank a lot of whisky, and went to bed feeling very jolly and comfortable indeed. But in the morning the men who had not taken any whisky got up all right; those who had taken a little whisky got up feeling very unhappy; the men who had taken a lot of whisky did not get up at all: they were simply frozen to death. They had warmed the surface of their bodies at the expense of their internal organs."

E. S. Reynolds, M.D.(Lond.), F.R.C.P. (*Hygiene for Beginners*, p. 153): "Alcohol is not required by the body, and, as a rule, to which there are few exceptions, people are much better and healthier without it; for instance it has been repeatedly proved that soldiers can bear the hard labour of war very much better when no alcohol is given to them. Alcohol, moreover, lessens the power of resistance to cold and to diseases, especially those due to germs."

Col. J. Lane Notter, M.A., M.D., and Col. R. H. Firth, F.R.C.S. (*Hygiene*, p. 172), ". . . it is beyond question that it [alcohol] tends to lower the natural resisting power of the body against cold, . . ."

J. Mitchell Bruce, M.A., M.D.(Lond.), F.R.C.P. (*Materia Medica and Therapeutics*, p. 163):—". . . The bodily temperature is, on the whole, lowered by alcohol: (1) by increased circulation through the dilated peripheral vessels; (2) by increased perspiration; (3) by diminished metabolism;

and (4) after large non-medicinal doses, by general depression. The sense of warmth is, on the contrary, increased by the flushing of the skin with blood ; a condition which promotes bodily heat and comfort in a warm or moderately cool atmosphere, but causes rapid refrigeration, general vital depression and possible death in low states of the external temperature."

A. E. Durham, F.R.C.S., and M. S. Pembrey, M.A., M.D. (Art. "Cold," Quain's *Dictionary of Medicine*), "Alcohol though useless or injurious if taken to fortify against cold, is useful and beneficial when judiciously administered as a restorative after exposure."

Major-Gen. Kenneth Mackay, C.B., M.L.C. (*Across Papua*, p. 133), "At Buna Bay, Monckton had lent me his aluminium water-bottle, which since had been filled with tea each morning, a sip of it being alike a comfort and a stimulant to me during the stiffest climb. I know that many people consider tea is a poison. Personally, I can only say I have used it as a daily drink from Beira to Capetown ; over 8,000 miles of India, and from sea to sea in Papua, with such good results that I would never dream of drinking anything else in a tropical country, or when engaged on work that demanded constant and severe exertion. Whatever may be said for or against tea, one thing is beyond all possibility of denial—alcohol is the very worst drink a man can indulge in in Papua. . . . Sir William McGregor, a medical man of great tropical experience, as a result of personal observation among missionaries and others, says, 'Even the man that is temperate does not endure hardship or keep his health so long or so well as the total abstainer.' The natives who are practically universally free from alcoholic craving, call all liquor 'silly white men's medicine.' As regards Papua they could not give it a better name."

That the Pupil of the Eye is a Material Black Spot

It is a hole in the iris, the coloured portion of the visible part of the eyeball. The size of hole is automatically adjusted to suit the intensity of the light falling upon the eye. If the intensity is great the pupil is small. The reason the pupil looks black is because the retina, which line the back of the cavity of the eyeball, is of a dark colour, and the illumination of the interior of the eye is practically nil compared with the light outside the eye. Such illumination as there is, is due to the light which enters through the pupil.

That a particular Vessel, Nerve, Vein, or Artery goes from the Heart to the Fourth or Ring-finger of the Left Hand

It is commonly stated that the ring-finger was selected as such because of its possessing such a special connection with the heart, which is metaphorically regarded as the seat of the affections. That this belief is of old standing is proved by the fact that Sir Thomas Browne, M.D., refuted it in his *Vulgar Errors*, so long ago as 1646. He deals with it in Chap. 4 of Book IV., and devoted four pages to the subject. There is no truth in the common statement. The head-quarters of most of the *nerves* are in the brain, and of course *every* vein and artery is connected with the heart, and those of the ring-finger are not in any sense "short-circuited" with the heart, that is they are not connected with it by a shorter length of artery or vein than any of the other fingers.

Notes and Queries of Oct. 16, 1915, at p. 310, had the following:—"Wedding Ring and 'Left-Handed' Marriage" (11 S. xii. 258).—Brand's "Popular Antiquities," pp. 356-7, new edition, Chatto & Windus, 1900, contains the following:—

"The wedding ring is worn on the fourth finger of the left hand because it was anciently believed, though the opinion has been justly exploded by the anatomists of modern times, that a small artery ran from this finger to the heart. . . . In the Hereford, York, and Salisbury Missals the ring is directed to be put first upon the thumb, afterwards upon the second, then on the third, and lastly on the fourth finger, where it is to remain. As Selden has noticed, it is very observable that none of these Missals mentions the hand, whether right or left, upon which the ring is to be put.

"From Aulus Gellius it would seem that the ancient Greeks and Romans wore the ring *in eo digito qui est in manu sinistra minimo proximus*. . . . In the 'British Appollo' (1708), to the inquiry, 'Why is it that the Person to be married is enjoyned to put a Ring upon the fourth Finger of his Spouse's left Hand?' it is answered, 'There is nothing more in this, than that the Custom was handed down to the present age from the practice of our Ancestors, who found the left Hand more convenient for such Ornaments than the right, in that it's ever less employed; for the same reason they chose the fourth Finger, which is not only less used than either of the rest, but is more capable of preserving a Ring from bruises, having this one quality peculiar to itself, that it cannot be extended but in company with some other

Finger, whereas the rest may be singly stretched to their full length and straightness.' WM. H. PEET."

"The rubric in our English Prayer-Book is based upon one to the same effect in the Sarum Manual, which gives as a reason that from that finger proceeds a particular vein to the heart, which mediæval idea is, of course, quite erroneous. Perhaps the original reason may have been that on the left hand the ring was more out of the way and less likely to be lost or injured. The fourth finger is explained by the custom of placing the ring on each finger in turn, beginning with the thumb, in the name of each Person in the Holy Trinity, and leaving it on the fourth after the 'Amen.'

"Winterton, Lincs. J. T. F."

"The fourth finger of the left hand has from long usage been consecrated to the wedding ring, from an ancient belief that from this finger a nerve went direct to the heart. So completely was this fanciful bit of physiology confided in by the Greeks and Romans, that their physicians term this the medical or healing finger, and used it to stir their mixtures, from a notion that nothing noxious could communicate with it, without its giving immediate warning by a palpitation of the heart. This superstition is retained in full force in some country places in England, particularly in Somersetshire, where all the fingers of the hand are thought to be injurious except the ring-finger, which is thought to have the power of curing any sore or wound which is stroked by it. That a sanatory power is imparted to the wedding ring, is believed by the peasantry, both in England and Ireland, who fancy any growth like a wart, on the skin, may be removed by rubbing a wedding ring upon them."—*Book of Days*, Vol. I., p. 220.

That the Ninth Day After a Confinement is a Most Important One

"Great importance is attached by the public to particular days and periods. Now there is, in reality, a curious law of periodicity in the animal world, but the public have not always been happy in hitting upon the real examples, and greatly overdo the point of fact. The ninth day of a confinement is well-known to be considered a most important day. The lady may live as she likes on the eighth; but on the ninth, if she does not keep strictly to her bed, it is ten to one if she gets well at all. Some, rather more reasonable,

fancy that the first nine days are to be devoted to quietude; and as this reading has some good effect, it is not so very objectionable. However, in reality, the ninth day is of no more importance than the eighth or the tenth, and the particular importance attached to it is only a kind of superstition."—J. B. Harrison, Surgeon, *Chamb. Edin. Journ.*, p. 123.

Dr. Pye Chavasse (*Advice to a Wife*) does not refer to the ninth day.

That a Person Weighs more when Dead that when Alive

"This," says J. B. Harrison, Surgeon, in *Chamb. Edin. Jour.*, p. 141, "is one of the popular errors which one cannot well suppose to prevail amongst the better-informed part of society. The phrase *dead weight* has probably sprung up from this idea. Why a person should be heavier when he is dead is not very apparent, unless the principle of life is to be considered as one of levity, as phlogiston was supposed to be by the philosophers of a former day. The supporters of Stahl's celebrated doctrine of phlogiston believed that when a body was burnt, a principle, which they called *phlogiston*, escaped from it in the form of light and heat; but unfortunately for this view, it was found, when the products of combustion were carefully collected, that they weighed more than the body did previously. This would have been fatal to their doctrine, had not the idea been broached that phlogiston was a principle of levity, which, being removed, left the body heavier than before.

"This was, of course, quite fallacious, and so would such an idea be with respect to life. One reason that a dead body is thought to be heavier than a living one is probably this, that in carrying a living person we have the centre of gravity adapted by the person carried to suit the convenience of the carrier and maintained in a position as far as possible to fall within the base of his body. Again, the elasticity of the structures of the body, especially the cartilages, though not in reality diminishing the weight, gives an appearance of lightness, as we see in the beautiful movements of the stag, and this would seem to corroborate the notion of living creatures being lighter than dead ones. We have also phrases which would seem to imply that lightness was a concomitant of gentleness. How often we are

admonished by the poets to tread lightly on the ashes of the dead ! "

With regard to the last two sentences, the placing of the feet gently (*slowly*) on the ground does prevent the pressure of the feet being *more than* the weight of the person's body, as it ensures there is no force due to momentum, such as there is when a person stamps his feet.

That if a Woman about to Become a Mother is Suddenly Frightened, her Child will have a Birthmark (mother's mark) which may bear some resemblance to the Cause of the Fright

" And I the rather wean me from despair,
For love of Edward's offspring in my womb :
This it is that makes me bridle passion,
And bear with mildness my misfortune's cross ;
Ay, ay, for this I draw in many a tear,
And stop the rising of blood-sucking sighs,
Lest with my sighs or tears I blast or drown
King Edward's fruit, true heir to the English crown."

Henry VI. (3), IV., iv., 17.

In *The Merchant of Venice*, I., iii., 73-85, Shakespeare adopts the Biblical account from *Genesis* XXX., vs. 32-41.

A similar idea is contained in the story of Jacob, Laban, and the sheep and cattle.—*Genesis* XXX., vs. 32-41.

" Everybody has heard of strawberries and cherries being represented on children's heads and backs, and people pretend that these appearances alter according to the season of the year, as the fruit may or may not be ripe. The question as to the origin of these marks appears at one time to have given rise to rather a warm controversy."—J. B. Harrison, Surgeon, *Chamb. Edin. Journ.*, p. 141.

" The so-called mothers' marks (*nævi*) are nothing more than excessive dilation of the capillary vessels on a spot of skin varying in size from a mere point to a patch of several inches square. The simplest form of nævus is that which is called the ' spider-mark ' ; it is a small red point, from which a number of little straggling vessels radiate on all sides. This mark is usually developed on the face and not unfrequently on the cheek ; sometimes the mark resembles in size and colour a red currant ; sometimes a cluster of currants ; sometimes a strawberry or raspberry ; and sometimes is uniform and of considerable extent, and is compared to a lobster. . . .

" The notion of these marks having any connection with the imagination of the mother is perfectly fabulous ; so that husbands need be under no apprehension of seeing a red dab on their child's forehead, if their ladies choose to have an ungratified longing for a feast of peaches in mid-winter. Neither need mothers wrong themselves by idle reproaches, from supposing that any unchecked desires on their part have become a cause of deformity to their off-spring. . . .

" Moles are of a dark colour, generally covered with hair of a longer or shorter growth, and come under the popular designation of ' mothers' marks.' For example : when sufficiently large and moderately tufted with hair, no matter what their form, they are the representatives of the ' back of a mouse.' One, of which I have a model in my possession, of a regularly oval form, and situated on the lower part of the face, is called by its possessor ' the leg of a sucking-pig.' In this case it is clear, that, the child having been born with a patch, the mother cast back her thoughts for the object which most excited her ' longings ' during gestation ; the sucking-pig's leg was the only thing having hair on it she could recollect, *ergo*, the patch, though oval, though totally deficient in every kind of resemblance to the object in question, must of necessity be a sucking-pig's leg. Indeed, these ex-post-facto deductions are very ridiculous."—*On Healthy Skin*, Erasmus Wilson, F.R.S., pp. 233 and 265.

" As regards ' Mothers' Marks,' the question has been allowed to stand, in deference to a widely felt prejudice ; but, considering that the negative evidence of the existence of marks being due to mental impressions made on the mother before the birth of the child is almost overwhelming, no credence can be expected to the statement of facts to the contrary unless they be substantiated by an exact transcript of notes made *before* the birth of the child."—Sir Francis Galton, F.R.S., *Life History Album*, p. 4.

The author's question in *Notes and Queries* resulted in so much material that he can only give the references to it here : Oct. 14, 1916, p. 316 ; Jan. 6, 1917, p. 17, wherein Dr. Pohlman (writing in Aug., 1916) is quoted as summing up the evidence he had examined with the words, " Maternal influence, therefore, does not make out a case. The strongest arguments it can bring are its antiquity, its ubiquity, and its iniquity."—Jan. 27, 1917, p. 76 ; and April 14, 1917, p. 283.

J. A. S. Watson, B.Sc., F.R.S.E., *Heredity*, p. 32, in dealing with maternal impressions: " . . . carefully planned experiments have always failed to bring forth positive evidence."

Dr. Edgar Schuster, M.A., D.Sc., at pp. 203-5 of his *Eugenics* (1912) sums up: " In the present state of our knowledge it would not be far wrong to say that ' maternal impressions ' are exceedingly unlikely to influence the characters of the human race, either for good or for ill, by impressing on children still unborn the likeness of the objects which caused them."

The *Daily Mail*, June 22, 1910, reported that a new treatment for lupus, birthmarks, warts, and moles was in use at Charing Cross Hospital, being the application (to the part affected) of carbonic acid gas frozen solid. The temperature of the frozen gas is about 100° C. below zero, and the application lasts from 30 to 60 seconds. In all cases the action is the same. The intense cold freezes the part for a second or two, and severe local inflammation, leading to a breaking down and absorption of the abnormal tissues, results. This heals in the natural, ordinary way, leaving the skin surface practically normal.

Among the Chinese, the fact of a boy having a hair-lip was explained to Prof. de Groot as resulting from the child's mother having during her pregnancy accidentally made a cut in an old coat of the father's she was mending.

One case is reported which seems to support the popular idea: a mother on visiting the Zoo was grabbed at by one of the bears. When her child was born, it had bare (bear) feet!

" What is that bruise you have on your forehead?" " It is a berth-mark." " Birth-mark, that's not a birth-mark!" " Yes, it is a berth-mark; I got it on board through going into the wrong berth!"

" I have a friend who is an albino: his mother was frightened by a white rabbit"!

That the Consumption of Vinegar is a Simple and Harmless Method of Reducing Obesity

In the Gulstonian Lectures delivered by Dr. Thos. King Chambers in May, 1850, the subject was "Corpulency," and Dr. Chambers alluded to the use of vinegar thus:—" Vinegar has been employed by those who are foolish enough to

practise upon themselves, but as it produces thinness only by injuring the digestive organs, the benefit is not worth the price paid for it, and no medical man would ever advise the use of such a remedy."

"Young ladies with an undue tendency to corpulency are said sometimes to drink vinegar freely with the view of improving the figure; but, as vinegar only causes thinness by injuring the digestion, it is obviously not worth while to run the risk of exchanging slight fullness of habit for chronic dyspepsia."—*Cham. Ency.*, Vol. X., p. 485.

That Galoshes, Patent Leather Boots, and Canvas Shoes with India-rubber Soles "Draw the Feet"

We are not going to argue that galoshes and patent leather boots are particularly sanitary. Far from it; they are more or less necessary evils, the former on account of very wet weather, and the latter because of the dictates of fashion.

The foot-wear named do not draw perspiration out of the feet, but that which comes out normally is prevented from escaping, hence the quantity present and the resulting unpleasantness. A mackintosh acts in a similar manner, and the *inside* of one, after several hours' use, will often be found to be nearly as wet as the outside, due to the imprisoned perspiration. They are certainly insanitary and should be as little worn as possible. Those that are well ventilated are the lesser evil.

That a Glass Eye lasts practically for Ever, and that it is Solid.

"An artificial eye consists of a thin shell, usually of enamelled glass, coloured to present as nearly as possible the same appearance as the visible part of the normal eye. Quite recently Celluloid has been used instead of glass, and it is said to last better, as its surface is not affected by the secretions; . . . A single glass eye can rarely be worn more than a year without being polished, for the surface becomes roughened by the action of the tears, &c., and irritates the lids as they rub over it. The wearing of a glass eye therefore means an expenditure of at least one or two pounds a year, and is thus out of the power of many poor people to whom it would otherwise be an advantage."—*Cham. Ency.*, Vol. IV., p. 517.

Mr. R. S. Frampton, writing on June 8, 1911 :—" The continual and natural blinking of the eyelids, and the saline moisture which is in the socket, or emanates from it, causes the surface of an artificial eye to become very rough, rougher than a piece of ground-glass. To very sensitive sockets this is highly painful and in time causes granulations or swellings in the socket, and in some cases the person has had to give up wearing an artificial eye."

That a Person's Hair Grows After Death

" A prevalent belief, strengthened by the opinion of several modern French writers on this subject, is, that the hairs grow after death. . . . I fancy that I have seen an apparent growth of the downy hairs on the dead body, where decomposition has made considerable progress, but I am unwilling to believe in such a phenomenon without further and more careful investigation. The lengthening of the hairs of the beard observed in a dead person is merely the result of the contraction of the skin towards their roots, and not a vital process continuing after the death of the individual ; indeed, it is identical with a similar pushing of the hair which is known to take place in posthumous plaster casts ; a mere result of contraction of the plaster, and occurring where growth from nutrition could never be suspected." —Erasmus Wilson, F.R.S., *On Healthy Skin*, p.104.

That the Use of Chloroform in Child-Birth is Dangerous to the Mother and the Child

Sir James Young Simpson, Bart, M.D., who introduced chloroform as an anæsthetic, was born on June 7, 1811. His centenary was celebrated in 1911 and in connection therewith the *Edinburgh Medical Journal* published a special issue in which it pointed out the important influence of Queen Victoria in establishing chloroform as a frequent and popular anæsthetic. At first there was an outcry against the use of the anæsthetic. Much of the opposition was of a religious nature, and the Bible was quoted to show that it was wicked to use chloroform, especially for women during childbirth. Queen Victoria had a long consultation with Simpson on the subject, and shortly afterwards herself used chloroform during confinement. Popular prejudice was quickly allayed, and the progress of chloroform became rapid and widespread.

Mr. J. S. Laurie wrote thus in *The Times* of May 11,

1870 :—" Dr. Simpson, on first propounding the theory of the application of chloroform to patients requiring surgical aid, was stoutly opposed by certain Calvinistic objectors, who held that to check the sensation of pain in connection with ' visitations of God ' was to contravene the decrees of an All-wise Creator.

" What was his answer ? That the Creator, during the process of extracting the rib from Adam, must necessarily have adopted a somewhat corresponding artifice—' For did not God throw Adam into a deep sleep ? ' The Pietists were satisfied, and the discoverer triumphed over ignoble and ignorant prejudice."

Mr. Pye Chavasse, F.R.C.S., in *Advice to a Wife :* " Chloroform, then, is a great boon in midwifery practice ; indeed, we may say with Dr. Kidd that in labour cases ' it has proved to be almost a greater boon than in the experimental and gigantic operations of the surgeon.' It may be administered in labour with perfect safety by a medical man. I myself give it in nearly every case of labour, and always with benefit to my patient and satisfaction to myself. . . . (p. 227).

" There is another advantage in chloroform ; the child, when he is born, is usually both lively and strong, and is not at all affected by the mother having had chloroform administered to her. That is a most important consideration. . . . (p. 229).

" So highly do I think of chloroform, that I never go to a labour without a bottle of it in my pocket." (p. 229).

Quain's *Dictionary of Medicine* refers to the use of chloroform in connection with child-birth, and does not say its use is harmful.

That Laughing-gas is Dangerous to the Heart.

C. E. Wallis, M.R.C.S., L.D.S., says, " It would be much more dangerous to perform the operation *without* the gas on account of shock."

Quain's *Dictionary of Medicine*, p. 61, " Whenever practicable, nitrous oxide [laughing-gas] should be employed, either with oxygen, with air, or alone, since it is the safest known anæsthetic. If inadmissible or unobtainable, ether should be chosen. In other words, nitrous oxide and ether should be the two routine anæsthetics for general surgical work. . . ."

That Blood is Purified During its Passage Through the Heart

The heart is merely the pump for causing the circulation of the blood through the arteries, veins and lungs. It is while it passes through the lungs, where it is brought nearly into contact with a large surface of air, that it is purified, *i.e.*, it gives up carbonic acid gas and absorbs oxygen, and changes from a bluish colour to a bright scarlet.

That there is in the Mind of Man a Universal Standard of Beauty with respect to the Human Body

" The senses of man and the lower animals seem to be so constituted that brilliant colours and certain forms, as well as harmonious and rhythmical sounds, give pleasure and are called beautiful ; but why this should be we know not. It is certainly not true that there is in the mind of man any universal standard of beauty with respect to the human body. It is, however, possible that certain tastes may in the course of time become inherited, though there is no evidence in favour of this belief ; and if so, each race would possess its own innate ideal standard of beauty. It has been argued that ugliness consists in an approach to the structure of the lower animals, and no doubt this is partly true with the more civilised nations, in which intellect is highly appreciated ; but this explanation will hardly apply to all forms of ugliness. The men of each race prefer what they are accustomed to ; they cannot endure any great change ; but they like variety, and admire each characteristic carried to a moderate extreme. Men accustomed to a nearly oval face, to straight and regular features, and to bright colours, admire, as we Europeans know, these points when strongly developed. On the other hand, men accustomed to a broad face, with high cheek bones, a depressed nose, and a black skin, admire these peculiarities when strongly marked."—Darwin, *The Descent of Man* (1901), p. 890.

The native races at the Cape complain that the white man has an objectionable smell ; it need hardly be added that the white man makes the same remark with regard to the black !

As an extension of the principle laid down in the latter part of the quotation from Darwin, perhaps it may be added that after travelling 55,000 miles in South Africa, Europe, and the United States I have come to the conclusion that one may see more pretty girls in London in an hour than in a month anywhere else.

That frequently on opening an Old Coffin the Body and Features are seen exactly as they were at the time of Burial, and then a moment after, under the influence of the atmosphere, the remains subside into Dust.

"For the satisfaction of a mere wager George IV. disinterred the remains of Charles I. at Windsor. For a moment after the opening of the coffin the dead King was seen exactly as represented in Vandyke's portraits, but under the influence of the atmosphere the features subsided into dust and exposed a bare skull. The same experience marked the exhumation of Henry IV. in Canterbury Cathedral in 1832."—*T.P.'s Weekly*, Jan. 17, 1908.

The foregoing is by way of illustrating the manner in which the statement is usually made.

On putting an inquiry about the matter in *Notes and Queries*, there were many replies published therein between June, 1915 and Dec., 1916 (that of Mr. A. L. Humphreys being particularly full), and readers are referred to them for further information, the following being merely extracts from some of the replies.

At the outset it must be clearly understood that we are *not* denying that bodies are not uncommonly found in a wonderful state of preservation, with the features easily recognisable. The fallacy is that having been so found, they crumble into a heap of dust a few seconds after.

An important fact (as the cause of the alleged crumbling to dust is said to be due to the access of air) is whether the bodies were buried in air-tight lead coffins, but most unfortunately the material of the coffin is scarcely ever mentioned.

The opening of the coffin of King Charles I. took place on April 1, 1813, and in the same year an account of the opening, written by Sir Henry Halford, who was present, was published. An extract from this was given by Mr. Robert Pierpoint in *Notes and Queries*, Nov. 6, 1915, at p. 363. "A quantity of unctuous or greasy matter, mixed with resin, as it seemed, had been melted, so as to exclude, as effectually as possible, the external air. . . . great difficulty was experienced in detaching it successfully from the parts which it enveloped.

". . . When it came off, a correct impression of the features to which it had been applied was observed in the unctuous substance. At length the whole face was dis-

engaged from its covering. The complexion of the skin of it was dark and discoloured. The forehead and temples had lost little or nothing of their muscular substance ; the cartilage of the nose was gone ; but the left eye, in the first moment of exposure, was open and full, though it vanished almost immediately ; . . . many of the teeth remained, and the left ear . . . was found entire." This account differs most materially from that quoted from *T.P.'s Weekly*, the only support to the popular belief being the crumbling of the left eye, and as the human eye in life is nearly all water, this is not remarkable, but as for the rest of the head and body, Sir Henry's record shows that they were in anything but a crumbling state.

At p. 448 of *Notes and Queries*, Dec. 4, 1915, an account is given of the opening of the lead coffin of Bishop Bossuet, 150 years after his death and again the features were found to be firm.

At p. 465 of *Notes and Queries*, Dec. 11, 1915, an account of the opening of the coffin of Edward IV. is given, " . . . the whole of the remains would soon have been dispersed over various parts of the earth ; one secreting some hair, a second a tooth, a third a finger, &c. . . . " Hence, again there was no crumbling to dust in a few seconds.

At p. 92 of *Notes and Queries*, Jan. 29, 1916, Mr. A. L. Humphreys quotes from an account of the opening of the coffin of Edward I., written by Sir Joseph Ayloffe. In this case the body had been embalmed particularly carefully, and was in a decidedly firm condition.

At p. 114 of the issue of Feb. 5, 1916, Mr. Humphreys gave yet other instances, viz., the opening of the graves of Turenne, Henry IV. of France, and Louis XIV. In all these cases, too, crumbling to dust did not occur, but in the case of the body of Pope Sylvester II., it is alleged by his biographer, F. Picavet, that " l'action de l'air le fit tomber en poussière . . . "

At p. 115, there are accounts of the opening of the coffins of the wife of D. G. Rossetti, Oscar Wilde, T. C. Druce, and John Hampden, and in these cases, too, the bodies did not crumble to dust and were in no danger of so doing.

At p. 192 of the issue of Mar. 4, 1916, Mr. Archibald Sparke, F.R.S.L., wrote : " But what has been said does not bear upon Mr. Ackermann's original inquiry further than as adding to the many instances recorded of bodies not

falling to dust immediately on exposure." He then quotes an account of the opening in 1866 of a coffin in the family vault of the family of Anderton of Lostock in which it is stated that, " In two or three minutes after being exposed to the air," it crumbled to dust. Earlier in the account it is stated that, " The coffin lid was easily removed because of its decayed state ; and the coffin itself was upon a ledge in the eastern wall of the tomb." Thus the coffin would appear to have been very far from air-tight, and to have been exposed to the air of the vault all the time, hence the explanation that the alleged crumbling was due to exposure to the air for two or three minutes is very unsatisfactory.

At. p. 472 of the issue of June 10, 1916, Mr. Humphreys gives yet three more cases, this time from the grave-yard of St. Martin in the Fields, Charing Cross, in all of which the bodies were perfectly preserved though not embalmed and there was no crumbling.

Sir Thomas Browne, in *Urn Burial*, Chap. III., states that the body of the Marquis of Dorset, " seemed sound and handsomely cereclothed, that after seventy-eight years was found uncorrupted," and in a footnote, reference is made to *adipo-cire*, the substance found in such preserved bodies, of which Sir Thomas " is admitted to have been the first discoverer."

A detailed account of the opening of the lead coffin of John Hampden, the patriot, on July 21, 1828, will be found at p. 97 of Vol. II. of Chambers' *Book of Days*. It proved to be a very substantial corpse, and nothing of the nature of crumbling took place, though in this case the body, having been in a lead coffin, may have been kept from the action of air until the opening. Vide a full account by the author of a case which he followed up and reported at pp. 530-1, *Notes and Queries*, Dec. 31, 1921.

In conclusion, it may be pointed out that if the alleged crumbling were due to a few seconds' exposure to air, this would mean such a rapid oxidization that heat and even fire might be expected ! Moreover, if the remains were in such a delicate state as is implied, the slightest vibration would probably cause them to crumble, and this vibration would probably be caused by the opening, so that the crumbling, if any, would take place before the features could be seen.

That some people have in fact Double Joints.

There are no such things as double joints in the case of human beings—there may be in machinery. When people have what are popularly known as double joints, it means that the ligaments holding the ends of the two articulating bones together are slightly looser than usual, and this allows more freedom in the relative movement of the parts. Contortionists have permanently stretched the ligaments of their joints by repeated and increased contortions.

That Eye-Teeth are in some Special Way connected with the Eyes.

Eye-teeth is another name for canine teeth. They are the teeth which characterise carnivorous animals by whom they are used for tearing the flesh from their prey.

Mr. C. E. Wallis, M.R.C.S., L.D.S., says, " Eye-teeth have nothing to do with eyes."

That Hair, especially on the Chest of a Man, is a Sign of Great Strength

" The glory of a woman is her hair," so that if abundance of hair were a sign of muscular strength we should not hear fair woman spoken of as the weaker vessel. A medical friend tells me that some consumptive men are " as hairy as Esau." Possibly the idea has arisen from the account of Samson and his hair.

That Opening the Eyes in Cold Water every Morning has a Strengthening Effect on them.

Dr. A. Percy Allan, M.D.(Lond.), wrote, Aug. 2, 1919 : " I cannot see how opening the eyes under cold water can strengthen them ; we employ normal salt solution as an eye lotion, but pure water would probably irritate the mucus membrane (conjunctiva)."

One objection to the practice is that the plain water would have an osmotic effect ; hence the use of salt, as mentioned by Dr. Allan. A solution of boracic acid is commonly used as an eye lotion. This has the effect of preventing the osmosis, besides having an aseptic action.

That the Relation between Cause and Effect in the case of Living Tissue is Less Rigid than it is in the Case of Lifeless Matter

One of the most delightfully written light scientific books which it has been my good fortune to read is *The Spirit of*

the Soil (1915), by Gordon D. Knox. It is an account of the work of the late Prof. W. B. Bottomley, M.A., on the fixation of nitrogen in the soil by bacteria and of the production of auximones in bacterized peat. At p. 136, " The main underlying fallacy vitiating the anti-vivisection campaign—when the opposition is not due merely to sentimentalism—is the common belief that in cases where living tissue is concerned the relation between cause and effect is less rigid than it is in the case of lifeless matter. Scientific biology is frankly based on the principle that causal relations do obtain rigidly so far as the material side of life is concerned, and many biologists—returning to the problem of predestination, and free will—would hold something closely akin to the doctrine of predestination, and contend that every act is the inevitable result of an intensely complex set of causes."

That it is Bad for our Teeth to allow a piece of Ice to come into Contact with them

Mr. C. E. Wallis, M.R.C.S., L.D.S., wrote on Sept. 22, 1919 :—" Contact of ice with our teeth has no harmful effect whatever. I have also looked up many dental books and found no reference to it, and also consulted an American dentist who has great experience of people who live on ice water and he agrees that no harm is produced by contact with ice."—Vide *La Stomatologia*, Milan, July, 1913.

That from the statement by Juvenal, *mens sana in corpore sano*, it is to be inferred that a sound mind never inhabits an unsound body, and *vice versa*.

On considering this common belief it will be found that there are at least many notable exceptions to it, as the following will indicate :—

Robert Louis Stevenson, author, was very delicate all his life and he died comparatively young. To Tom Gallon, another author, the same remarks apply. Newton, mathematician, and James Watt, the engineer, were delicate as boys. Huxley, anatomist, tells us in his brief autobiography : " . . . for years I suffered from occasional paroxysms of internal pain, and from that time my constant friend, hypochondriacal dyspepsia, commenced his half century of cotenancy of my fleshy tabernacle." Darwin, naturalist,

scarcely knew what it was to feel perfectly well for more than a few days together. Phil May, artist; Keats, poet; Aubrey Beardsley, artist, were all consumptive. Oliver Heavyside, a living mathematician and physicist, is not strong. In a short life of Alexander Pope, author, Mr. H. R. Allport says, "His health, if the word may be used in such a connection, was of the most wretched description. His life was one long disease. He was deformed, dwarfish, and so feeble in constitution that he had to be built up each morning in a sort of framework to keep him together, and to wear several suits of clothes to preserve the vital warmth." The list might be greatly extended, but these are striking cases.

"With the mathematician, Philip Edward Bertrand Jourdain, there died on October 1 a truly remarkable character. Jourdain lived only thirty-nine years, but the amount and value of the work that he accomplished, considering the disabilities under which he laboured, are almost incredible. He was weakly from infancy, and as a child developed symptoms of the progressive paralytic condition known as Friedreich's ataxia. In spite of his unsteady gait and constant ill-health, he early showed great mathematical and mechanical capacity. He went up to Cambridge in 1898, then already a cripple. During his course at Cambridge he spent some time in Germany and became a fluent and scholarly linguist, speaking and reading several European languages. In 1904, though now physically quite incapacitated, he was awarded the Allen mathematical scholarship for research, and throughout the remainder of his short career his main activities were directed to the prosecution of mathematical investigations. His most important work was the discovery of certain series of infinite numbers. Working with Russell and Whitehead, he showed that certain arithmetical processes could be applied to them, and thus he obtained new and interesting results. He continued on this line of research, and even a few days before his death of the imminence of which he was fully aware, he succeeded in demonstrating the existence of a previously unsuspected series of infinites. His very last work was the discovery of a formula for the well-ordering of *any* aggregate."—*Nature*, Oct. 9, 1919, p. 116. *Vide* article by Dr. S. T. Irwin in *British Medical Journal*, Sept., 1921; and *Lady Montagu and Her Times*, p. 248.

That it is Dangerous for the Bowels to be Opened During the Menstrual Period.

"It is difficult to say how this superstition arose, but it is responsible for much serious illness in females, owing to consequent displacement and dropped bowel. As a matter of fact the direct contrary is true and an aperient taken at the time often relieves pain and congestion."—Dr. A Percy Allan, M.D.(Lond.).

That if a Woman Conceive during her period of Menstruation, the Child will have a "Port-Wine" Mark

"A port-wine mark has nothing to do with conception during menstruation."—Dr. A. Percy Allan, M.D.(Lond.).

That the Use of Contraceptives Results in Physical and Mental Harm

Sir Archdall Reid, K.B.E., M.B., F.R.S.E., became a Vice-President of the Malthusian League in 1920, and wrote an article on "Voluntary Parenthood" in the *Eugenics Review* for April, 1920, in which he stated that :—"If, then, the employment of contraceptive methods is inevitable, nothing remains but to consider the best means. . . . It is only necessary to add that all warnings which have appeared in print as to the physical and mental harm which results from the use of contraceptives have no basis in verified fact. They are usually mere expressions of prejudice. Of course, if a chemical be used in overpowering strength, a person may be injured physically; or he or she may be terrified by fears of alleged disaster, and so injured mentally; but the statement that the methods themselves, when used with ordinary common sense, are injurious, is pure fiction."

That for Biological reasons a Woman should not Marry her Deceased Husband's Brother

"Marriage with a Sister-in-Law.

"A Scientific View.

"By Dr. Leonard Williams.

"Lady Astor's question in the House of Commons on the subject of the marriage of a woman with her dead husband's brother recalls a time-honoured but now exploded fallacy. It used to be believed that it was uneugenic for a woman to

beget children by her dead husband's brother, assuming, that is, that she had a family by her first husband.

" Whence this idea arose it is now very difficult to say. It is probably the extension, though surely a muddled one, of the belief that the sire of a first offspring or litter left so indelible an imprint upon the dam that all subsequent progeny, even though diversely fathered, were liable to revert in type to the original sire.

" This was certainly believed in the matter of dog-breeding, and in country districts the legend still holds. It was also believed in the matter of horse-breeding, and there are still scientific and experienced horse-breeders who would not care to undertake any risk in this direction.

" In the last edition of the *Ency. Brit.* there is a long article explaining that this belief is entirely mistaken.

" But even if this belief be true in the case of animals, it is difficult to understand what the objection can be to the marriage between a woman and her dead husband's brother. For even if the children of such a union did resemble the first husband, there would be nothing objectionable in such a result.

" If we go back to the period of Moses, who was one of the greatest sanitarians that ever lived, we find that, so far from there being any impediment to the marriage of a woman with her deceased husband's brother, such unions were definitely encouraged, and we read in *Deuteronomy* xxv., 9, that a widow has the right to claim her bachelor brother-in-law as her second husband, and that if he is ungallant enough to refuse the lady's blushing offer, she has the right publicly ' to loose his shoe from off his foot and spit in his face.'

" It would seem therefore that Lady Astor has the highest scientific and religious support for her endeavour to get the absurd rule prohibiting the marriage of a woman with her deceased husband's brother removed from the Statute Book."—*Daily Mail,* Mar. 25, 1920.

That a Murderer in Aspect and Character conforms accurately with a Conventional form of Savagery

" All men's faces are true, whatsoe'er their hands are."
Antony and Cleopatra, II., vi., 97.

This error should soon die out now that it is the general practice of the daily and weekly press to publish many portraits of murderers. " Peter the Painter," who figured

in the "Battle of Stepney," in particular did not conform to the popular impression, for his portraits were distinctly good-looking; Bywaters, of Ilford, and his associate, Mrs. Thompson; C. J. Smith, the "bath" murderer (*Daily Mail*, July 2, 1915), and many others refute the error. In fact it may be said that it is rare for a murderer's features to conform to the novelist's pen portraits, but then they profess to write fiction!

That the Skin of a Negro has a Higher Heat-Emissive Power than that of a White Man

"The function of pigment is to absorb the visual rays, thereby protecting the blood and living tissues from dangerous effects. The pigmented man can, therefore, have a thinner horny layer to his skin, and lose heat well through flushed blood-vessels, without risks of injurious effects from ground glare and sky shine. The view which attributes a higher heat-emissive power to the skin of the negro is erroneous. Despite the above advantages, however, pigment puts an extra tax on the heat-regulating mechanism of the body, since it has to get rid of the heat into which light rays are converted.

"The great value of pigment is that it protects man from sunburn, and enables him to go naked and secure the full cooling power of the environment by losing heat by radiation, convection, and evaporation. The white man wears clothes to protect himself from sunburn, and the ill-effects of tropical climates are largely due to the wearing of unsuitable clothing, frequently from custom or from an idea of caste distinction."—*Nature*, Jan. 6, 1921, p. 603.

That a Permanent Squint may be Suddenly Caused by Voluntarily Squinting

There is nothing to justify this belief in a long article by Dr. Brudenell Carter in Quain's *Dictionary of Medicine*. Each eye is moved by six muscles, and squinting is only one of the many movements of which the eyes are capable. It would be just as logical to say that if the fingers of one hand are opened as wide as possible they may suddenly stick in that position.

Mr. Donald Gunn writes:—"This is false, even with the sometimes added rider 'if the clock strikes, or the wind changes.' It is only true in so far that squinting children,

in the earlier stages of their trouble, are liable to intermittent bouts of squinting. But this is entirely distinct ; as in their case the squint is *not voluntary*, though the unfortunate little creatures are often soundly slapped by their mothers for what is supposed to be wilful naughtiness, though it is a premonitory symptom of their disorder and, as such, entirely beyond their control."

That the Sympathetic Nervous System Acts only at Night, or when we are asleep, and that some other Nervous System Acts only in the Day or when we are Awake

Mr. C. E. Wallis, M.R.C.S., wrote, " The sympathetic nerves are not a separate system as formerly thought, but are now agreed to be merely the visceral branches of the spinal nerves. The sympathetic system acts always and regulates the blood pressure and all functions over which the will has no control."

FALLACIES CONNECTED WITH OURSELVES

(b) OUR SENSES

That Woollen Articles and Metallic Articles which have been in the Same Room for an Hour, say, are not of the same Temperature

In the summer, when there is no fire in the grate, a good experiment in this connection is to feel the hearth-rug and then the fire-irons. Most people will declare the latter to be at a lower temperature. In the winter a silver sugar basin and a woollen tablecloth will serve the same purpose. Undoubtedly the metal *feels* colder, but this only shows how deceptive our senses are if we trust to only one of them at a time ; for if a thermometer be left in contact for some time, first with the metallic article and then with the woollen, it will be found to register the same temperature in each case.

Metal is a good conductor of heat, and when we touch a metallic object (at a temperature of 50° F., say) with our hand—which is at a temperature of about 98° F.—the metal rapidly conducts heat away from the hand, and we say the object is cold ; but if we place our hand on a woollen shawl, which is at the same temperature as the metal (*i.e.* 50° F.), the wool, being a bad conductor of heat, does *not* conduct heat from our hand so rapidly, and we say the shawl is warm.

On the other hand, suppose the woollen and metallic articles to have been exposed for some time to a higher temperature than that of the hand, say to 130° F. They will then both be at this temperature, but on touching the metallic article with the fingers it will feel uncomfortably hot, whereas the woollen one can be handled with ease. Hence, judging only by the sense of touch, we come to an opposite conclusion to what we did in the first place, and *now* say the metallic article is at the higher temperature. In this second case the metal, being a good conductor, *rapidly* parts with some of its heat to the hand, which is at a lower temperature ; for when a cold body and hot body are in contact the temperature of the former rises and that of the latter falls, till they are both of the same temperature, if left in contact long enough. But when the woollen article is handled it only gives up its heat to the hand *slowly*, and thus causes no pain.

Now for a simple, though somewhat rough, test which can easily be made by anyone. Take two small pieces of ice, or lumps of snow, as nearly the same size as possible, and place one piece on each article. Then in the first case (both articles at 50° F.) the person who said the woollen article was the warmer would expect the ice on it to melt faster than that on the metallic article, but it does not. In the second case (articles at 130° F.) also, the ice on the metal melts more quickly than that on the wool.

In winter if one sheet be of linen, the other of cotton, the former feels colder than the latter, though they have been in close contact for some time and must be at the same temperature. Here again the linen is a better conductor of heat than the cotton.

If blankets had an innate property of keeping at a higher temperature than the surrounding air, it is certain they would not be used to cover up the blocks of ice in the ice-vans which are seen about during the summer. Being bad conductors of heat, they partially prevent the warmth of the summer air reaching the ice.

As a further experiment to prove the unreliability of the sense of temperature, take three bowls of water. Into the middle one put water at say, 60° F. Into the right-hand one put water at about 105° F., and into the left-hand one water about 35° F. Now place the left hand in the left-hand bowl of water and the right hand in the right-hand

one, and keep them there for say a minute. Then plunge both into the middle bowl. What is the result ? Why, to the left hand the water feels warm, and to the right it feels cool, though obviously it is all at the same temperature.

Boyle said : " The account upon which we judge a body to be cold seems to be that we feel its particles less vehemently agitated than those of our fingers or other parts of the organs of touching ; and consequently, if the temperature of that organ be changed, the object will appear more or less cold to us, though itself continue of one and the same temperature."

If some of the articles were damp, then the case would be different, for the evaporation of the moisture in them would produce a fall of temperature. For example, Mr. George Hubbard, F.R.I.B.A., in his article on " Dew Ponds," at p. 99 of the *Trans. Roy. Inst. Brit. Architects* for Feb. 3, 1919, states that the temperature of grass is always 3·6°F. lower than the air in its immediate neighbourhood ; and the present writer has found that the temperature of wet clay is 3° or 4° F. lower than the temperature of the air of the room in which it has been kept for many days. This is due to the evaporation of the water in the grass and clay respectively.

That a Pound of Feathers is Lighter than a Pound of Lead (both being Weighed in Air)

This idea is due to two things : (*a*) when thinking of the problem we are inclined to think of the handful of lead that would weigh 1 lb., and a handful of feathers, which would certainly not weigh 1 lb. ; (*b*) if the pound of lead be in the form of a ball, and the feathers be done up in a bag, then on placing the lead in the palm of the hand it touches only on a small area and the intensity of pressure is great, but the bag of feathers would more than suffice to cover the whole palm, and the intensity of pressure would be less, though the weight, or total pressure, is the same in each case.

Lastly, if one pound of lead and one pound of feathers were weighed in a vacuum, then on again weighing them in air, the feathers would appear the lighter, because they are less dense than the lead, and therefore displace more air weight for weight. Conversely, if they were first weighed in air and then weighed in a vacuum, the feathers would appear the heavier.

That One Sniff of Chloroform will Render a Person Unconscious

We believe the villain in the "penny dreadfuls" and caravan theatres flicks a handkerchief moistened with chloroform in the face of his victim, whereupon she immediately proceeds to do a stage-drop.

When chloroform is used as an anæsthetic, one of the methods is to put it on a handkerchief and then hold this over the nose and mouth of the patient, so that he may inhale the vapour. The time taken to produce insensibility depends upon the constitution and condition of the patient, and is usually some few minutes.

A case was recorded in the *Daily Mail*, Dec. 2, 1910, in which a Commissionaire (F. J. Brown) employed by the St. James's Club was robbed in daylight by having a loose bag "saturated with chloroform" pulled over his head. In this case we fortunately have this further information recorded by the *Evening News* of the same date, ". . . Brown at first thought he was chloroformed, but no trace of any drug has been found in the bag, which was used chiefly to muffle any cry he might have made, and to prevent him seeing his assailants."

R. N. Pickering, M.R.C.S., L.R.C.P., in a letter dated Nov. 7, 1912, wrote, "You are probably aware that in many cases in the administration of anæsthetics, patients become unconscious before the gas is turned on or the chloroform administered."

"I soaked a rag in the chloroform, and rushing to the bed clapped the rag to the old man's mouth. Instead of becoming unconscious he sprang at me, screaming and yelling at the top of his voice."—*Daily Mail*, July 29, 1911.

The last quotation is from the murderer's account of how he killed Mr. William H. Jackson, in New York.

That there is any Connection between Lunatics and the Moon

> *"It is the very error of the Moon;*
> *She comes more nearer Earth than she was wont,*
> *And makes men mad."*
>
> Othello, V., ii., 109.

That there was such a connection was believed by the ancient Greeks. The term "lunatic" is derived from the Latin word "luna," the Moon, and we find corresponding words in French, Spanish, and Portuguese-Italian similarly derived. The derivation thus embodies the old belief that

persons mentally afflicted were affected by the changes of the Moon. The word is seldom employed in medical literature, but in its common use it appears to be more particularly applied to those who become periodically insane, *i.e.*, those who have lucid intervals. It is interesting to notice that the Greek word " seleniakos," derived from " selene," the Moon, meant epileptic, or moon-struck, crazy.

Dr. Chas. Mercier, F.R.C.P., F.R.C.S., speaking at the Casual Club on Nov. 28, 1912, said there used to be patron planets as well as patron Saints, and that then the brain was supposed to be under the patronage of the Moon. He also said, " There is no monthly period in lunacy."

Edward Clodd (*Tom Tit Tot*, p. 64) tells us, " Equally puzzling to Plutarch was the custom among Roman women ' of the most noble and ancient houses ' to ' carry little moones upon their shoes.' These were of the nature of amulets, designed to deceive the lunacy-bringing moon-spirit, so that it might enter the crescent charm instead of the wearer."

In law, a lunatic is a person having lucid intervals, *i.e.*, there is a periodicity in the mental attacks, though the periods are not necessarily monthly or equal.

Dr. R. H. Cole, F.R.C.P., writing on Dec. 30, 1909, said, " I do not consider the insane are affected any more or less than the sane by the phases of the Moon. . . . In recurrent or alternating insanity the changes in mental states do not in the least correspond to those in the Moon. . . . Such expressions as ' moonstruck,' ' star-gazing ' can best be explained by the sensation of light on the retina of a wearied brain. I have seen in India—also in Egypt—the natives, like animals in general, coil themselves up so that the Moon should not shine on their faces during sleep, but that it would be dangerous is a superstition, and I have frequently let the Moon shine on my face at night without any effect."

Dr. W. D. Moore, the medical superintendent of the Holloway Sanatorium, Virginia Water, writing on Dec. 28, 1909, said, " I am not aware that there is any ground for the popular belief that persons of unsound mind are affected by the changes of the Moon."

Another notion connected with the Moon is that it is dangerous to sleep with the Moon shining on one. This appears to have as little foundation in fact as the other idea and its absurdity is apparent when it is remembered that the

intensity of the light from the full Moon is only 1/618,000th that from the Sun, while the heat from the Moon is only 1/185,000th that from the Sun. The belief has possibly arisen from *Psalm* CXXI., v. 6, " The Sun shall not smite thee by day, nor the Moon by night."

That we have only five senses.

Bardolph: *" Why, Sir, for my part, I say, the gentleman had drunk himself out of his five sentences."*
Evans: *" It is his five senses : fie, what the ignorance is ! "*—
Shakespeare, Merry Wives of Windsor, I., i., 161.

" But my five wits nor my five senses can
Dissuade one foolish heart from serving thee."
Shakespeare, Sonnet 141, 9.

Other Shakespearian references to the Five Senses are :—
King Lear, III., iv., 56.
King Lear, III., vi., 56.
Timon of Athens, I., ii., 120.
Midsummer's Night's Dream, IV., i., 32.
Twelfth Night, IV., ii., 85.
Romeo and Juliet, II., iv., 70.

One of Sir Thomas Browne's ' purple patches ' consists of the last three paragraphs of *The Garden of Cyrus* which open with, " But the quincunx of heaven* runs low, and'tis time to close the five ports of knowledge."

The said five senses are those of sight, sound (hearing), taste, touch and smell. If these were our only senses we should not be able to comprehend what a force is, any more than we can comprehend a fourth dimension.

The definitions of four of the senses named above are pretty simple, but when we inquire into the sense of touch, it is not found to be so simple. Suppose you grip firmly a metal letter-weight while it is lying on a table. You are thus able to gain certain information about it, *e.g.*, that it feels hard and cold, that it is possibly a metal, and that it is a certain size. Now while still gripping the weight firmly, raise it from the table. You are now able to give some further information about it, namely that it feels heavy. It is your sense of resistance or muscular sense that enables you to do this, for as far as *touching* the weight is concerned you are touching it in exactly the same manner as before and yet you now have more information about it. Again, imagine while the

* *Hyades* near the horizon about midnight at that time.

weight is resting on the table and you are gripping it, that it is gradually warmed by an electric coil or some similar means. You would be able to say that its temperature was rising. Hence we have a sense of temperature. On going still further into the matter it will be found that unless a body offers resistance when we go to ' touch ' it we should not be able to feel it; it would squeeze away into thin air, so to speak. Hence the sense of touch, popularly so called, should be replaced by the sense of resistance, and the sense of temperature. This would enumerate *six* senses, or if we retain the sense of touch and add the two named above we acknowledge *seven* senses.

Sir Ray Lankester, F.R.S., divides the sense of temperature into two, namely the sense of heat ; the sense of cold ; but this does not seem justifiable, for there is no physical difference between heat and cold. We usually call a thing hot which is hotter than our blood (98½° F.), and cool or cold when it is below that temperature. Cold is merely absence of heat, so that the difference between a hot body and a cold one is merely the difference in the quantity of heat which they contain. There is certainly no agreed dividing line between " hot " and " cold," so that alone would lead to a difficulty when trying to define a sense of heat and a sense of cold. Sir Ray Lankester also adds the equilibrial sense, and the sense of pain.

Beyond these we have (at least *some* of us have some of them !) a sense of humour ; a sense of proportion ; a sense of pleasure ; a sense of shame.

W. K. Clifford in his *Conditions of Mental Development* discusses a scientific sense ; an artistic sense.

To these we may further add a sense of locality [By this is not meant a knowledge of the situation of the nearest public house, but that sense which enables us to define roughly which part of our skin is touched] ; a sense of colour ; a sense of time.

In further considering these different senses we should realise that for some of them we have definite and special sense organs, while the others depend upon the education and training of the brain and are more matters of convention than true senses.

Irishmen sometimes allude (*Vide* the works of Lever and Lover) to their " seven senses "—one of these must be a sense of injustice !

The late Prof. Silvanus Thompson, D.Sc., F.R.S., capped all, for he was reported in the *Evening News* of Jan. 4, 1911, to have said, "People think they have only five senses, but they have nearer five thousand." And yet some of us are such —— fools!

The usual five senses are said to have been enumerated by John Bunyan in his *Holie Warre*.

Robert Louis Stevenson in his letter dated 5 March, 1872, to Chas. Baxter, wrote, ". . . and have been very happy ever since, as every place is sanctified by the *eighth* sense, Memory."

That to be Short-Sighted in Early Life is an Advantage in Later Life, as the Vision of Distant Objects then Improves

"Loss of accommodation occurs with the progress of years in such eyes [*i.e.*, long-sighted and short-sighted], just as in normal ones, though the effects are somewhat different. The short-sighted eye continues to be able to see near at hand without spectacles; but, contrary to the popular belief, has no other advantage over the normal eye as age advances, for vision of distant objects does not improve. The long-sighted eye in time loses the power of seeing even distant objects without spectacles; and the higher the degree of long-sightedness the earlier the age at which this occurs."—*Cham. Ency.*, Vol. IV., p. 516.

That the Victim of a Murderer Retains on the Retina of His or Her Eye the Portrait of the Assassin

It is unfortunate that this is not true, as if it were it would greatly assist to bring the criminal to justice.

Experiments made by Scotland Yard officials many years ago gave distinctly negative results.

"There is one popular delusion with regard to the possibilities of the camera in the detection of crime that is cherished by some people. It is widely believed that the victim of a murderer may retain on the retina of his or her eye the portrait of the assassin, and that a photograph of the dead person's eye may reveal the culprit's picture. At the time of the Merstham Tunnel mystery many people suggested that the police were lax in not taking photographs of the eyes of the victim, Miss Money. It seems almost a pity to shake a belief which has been found so useful by the writers of sensational novels, but the truth must be told. The camera,

great as are its powers, cannot achieve this feat. It is true that Professor Kuehne, of Heidelberg, and Professor Boll, of Vienna, managed, working with most elaborate precautions, to secure something like the photograph of objects retained on the retina of a rabbit. But this result was arrived at under such scientific conditions as could never obtain save in the laboratory of the experimentalist."—*T. P.'s Weekly, July* 10, 1908.

That Persons who are Colour-Blind can Perceive only Light and Dark

In extreme cases everything appears to be some shade of grey, but far more usually the blindness refers to only one colour. *E.g.*, some persons are red colour blind. Others (which are the more numerous) are green colour blind. Colour blindness varies in degree and may arise from a shortening of the visional power as regards either or both ends of the spectrum.

Vide *Colour-blindness*, Edridge Green, M.D.

That the Human Eye has the Power of over-aweing Lions and other Wild Animals

" As the man understands the thoughts of the dog, so the dog understands the thoughts of the man, by attending to his natural voice, his countenance, and his actions. A man irritates a dog by an ordinary laugh, he frightens him by an angry look, or he calms him by a kindly bearing ; but he has less spontaneous hold over an ox or a sheep. He must study their ways and tutor his behaviour before he can either understand the feelings of those animals or make his own intelligible to them. He has no natural power at all over many other creatures. Who, for instance, ever succeeded in frowning away a mosquito, or in pacifying an angry wasp by a smile ? "—Sir Francis Galton, F.R.S., p. 187, *Inquiries into Human Faculty.*

H. R. Allport in *Casual Club Papers*, III. Series, p. 81, gives an amusing account of how he tried to put the popular idea to practical use in the case of a dog which approached him, apparently savagely, on a lonely road :—" Then I bethought me of the stories which I had read in books of travel concerning the power of the human eye over the beasts of the field. ' There,' said I, ' is my great opportunity ; I

will reassert the prerogative of Adam, and will send this debauched mongrel howling to his own place.'

" Concentrating my energies, I poured upon the dog a gaze which I should have thought capable of penetrating an average plank. But—and this is a point which is always neglected in the books of travel—I found it impossible to make the fool understand that I was looking at him at all. I was wearing knickerbockers, and his whole attention was concentrated on the calves of my legs. His intentions, like those of the squire to the village maiden, seemed to be 'strictly dishonourable' ; the human eye, in my case at any rate, was a failure ; and I began to think with loving tenderness not of the girl, but of the stick which I had left behind me."

That at the Moment of Death, especially by Drowning, Every Event of the person's past Life is usually Recalled

Poets and painters are largely responsible for the perpetuation of errors. A great poem or a fine picture becomes valuable as time goes on, and no one would think of destroying them because they contain relatively minor blemishes, nor can the blemishes be corrected in later editions or reproductions (though in the case of a poem footnotes might be added referring to errors), and hence regrettably they assist in keeping people from the truth. But fortunately in the case of other works, new editions are cleared of the errors contained in former editions and the later ones are made to accord with the most recent discoveries and the advanced state of knowledge. (We hope this is true of this book ? !).

We have a good illustration of this in connection with the present fallacy. Nobody would now agree to have all errors removed from the works of Shakespeare (! !), and so they will be read by hundreds of generations yet unborn. In Scene IV. of *Richard III.*, the Duke of Clarence relates his dream to Sir Robert Brakenbury and in that dream he thought he was drowned and states the thoughts that occurred to him. Having related these the Duke exclaims (lines 64-5),

> *" O, Brakenbury, I have done those things,*
> *Which now bear evidence against my soul."*

See a detailed account of the experience of James Glaisher, F.R.S., in *Ency. Brit.*, I., 197, when he and Coxwell attained a height of 37,000 ft. in a balloon.

" I conclude from the proved number of faint and barely

conscious thoughts, and from the proved iteration of them, that the mind is perpetually travelling over familiar ways without our memory retaining any impression of its excursions. . . . It is apparently always engaged in mumbling over its old stories, and if anyone of these is wholly neglected for a while, it is apt to be forgotten, perhaps irrecoverably.

" . . . Probably many persons would have registered such a case as evidence that things once perceived can never wholly vanish from the recollection, but that in the hour of death, or under some excitement, every event of a past life may reappear. To this view I entirely dissent."—Sir Francis Galton, F.R.S., p. 139, *Inquiries into Human Faculty*.

The experience of isolated cases is not of much value, especially for the fact that as a rule even then it is difficult to obtain reliable information; the author may, however, mention that on one occasion he narrowly escaped a bad accident, which might even have proved fatal. He was fully aware of the imminence of the accident and its danger, but not one thought of the past entered his head. On the other hand he was *very* much concerned with the current event, and how to save himself!

His friends, R. L. Matthews and J. W. Spiller, told him on Sept. 28, 1915, that they had each (on different occasions) been so nearly drowned (without becoming unconscious) that they had made up their minds they were about to die, but neither had the above experience. Their chief concern was, as one would imagine, what to do to save themselves from death.

Notes and Queries in 1916 :—

" Memory at the Moment of Death (12 S. i. 49).

" One summer afternoon in 1882 two young and foolish boys jumped into Harrow ' Ducker ' for the first time without studying the record of the various ' depths ' indicated upon the edge of the bath. Neither could swim; and, as the water just came over the tops of their heads, they were soon in a bad way. T. was hauled out by O. B., an older and more expert Harrovian, and fortunately had sufficient breath and presence of mind left to say that your present correspondent was equally inefficient. So I also was rescued from a watery grave. I remember thinking that it was all up with me, and that, like Falstaff, I had swallowed an intolerable amount of water; but certainly the events of my past life did not kinematographically pass before me. How-

ever, we were none the worse ; and one afternoon two years later, when aged 16, I succeeded in swimming twelve lengths of the bath. ' Ducker ' is 500 ft. in length.

A. R. Bayley."

" During the second Afghan War (1878-80) I was at Quetta, where my duties brought me into intimate relations with a general who, as a youth, had served in the first Afghan War (1838-40). One day he related to me the following experience : His regiment was engaged in the first war, and he (a subaltern then) was severely wounded in the chest and left, as he thought, dying on the field. Whilst so lying on the ground he said that he saw all his sinful actions pass in review through his mind, and feeling horrified he prayed earnestly to be allowed to recover and try to amend his way of life. He was picked up, taken to hospital, and recovered. Afterwards he lived a strictly religious life.

" Kirkby Lonsdale. W. H. CHIPPINDALL, Col."

Notes and Queries, 12 S. I. 97—Jan. 29, 1916.

" MEMORY AT THE MOMENT OF DEATH (12 S. i. 49, 97).

" This is surely the most conspicuous case known of the persistence of a transparent fallacy. Nothing, of course, is more certain than that memory is particularly busy upon the near approach of dissolution ; and that no form of dissolution better serves for this than the last few struggling gaspings of the drowning is equally obvious, too, but the popular conception does not at all stop at this—far from it.

The current delusion is that death by drowning has in it something apart in kind, not merely from death in any other form, but even from suffocation by any other medium, an idea not remotely connected, probably, with the aspect of water as the sacred element in baptism and spiritual life, proving thus, as it were, the element of death. I do not think the popular mind on the matter would accept as possible this lively last picture of the past if drowning occurred in some other way—as with Clarence in his Malmsey butt, for instance. It must be drowning by water.

" I was ' drowned ' myself in an Irish lake exactly—well, no matter how long ago, but I was just 15 at the time. I and my victim, a lad of my own age, to whom I was giving a swimming lesson in ten feet of water, were dragged out by two boatmen and laid side by side on the grass just in the nick of time. We came to almost at once, dressed, and got

back to school before 'the bell,' feeling nothing the worse for the adventure. There was no revival of the past in all the frightfully distressing experience, none whatever; and I venture to think my time of life was the very best that could be chosen for the experiment. If there were the slightest physical or psychical basis for the belief, I was perfectly old enough to have had a glimpse at least of the supposed vision —could not, in fact, have possibly escaped it.

"It was a horrible experience, however, and every incident of it is as vividly present to me to-day as it was on the day of its occurrence—the roaring noise in the ears, the whirling spectrum colours gradually darkening, the leaden weight on the chest, above all the swallowing and getting nothing down, though the final melting into oblivion was easeful enough, the capacity to feel being just gone. But the past, as I have said, gave no sign whatever. MONA."

Notes and Queries, 12 S. I. 177—Feb. 26, 1916.

"MEMORY AT THE MOMENT OF DEATH (12 S. i. 49, 97, 177).

"When 22 years of age I came very near being drowned, and, in fact, had lost consciousness, so that I had no recollection even of my rescuer having reached me. I had before that heard that the past events of one's life are generally recalled by people losing their lives by drowning, but had no such experience myself.

"Nagpur. C. J. B."

Notes and Queries, 12 S. I. 258—Mar. 25, 1916.

In the *Daily Mail* of Feb. 14, 1918, there appeared a review of *Englishman, Kamerad*, by Capt. Gilbert Nobbs, and from it we extract the following:—

"Few soldiers, even in this war which has been so full of terrible experiences, can have suffered more than Capt. Gilbert Nobbs. . . .

"What is perhaps even more wonderful than these strange and touching adventures is the spirit with which he faces the tribulations of blindness. . . .

"The attack in which he fell was an enterprise of peculiar peril. The orders were 'Reach your objective at any cost. If driven back, you are . . . to hold out till the last man falls,' and the orders rang on his ears as a death sentence. Yet he tells us that the London Territorials, whom he led, never faltered; they went through one hell to enter another.

The recollection of their heroism prompts this comparison of the man at the front with the man at the back :—

> " Are the people left behind in England suffering hardships uncomplainingly and gritting their teeth like you are ? You are only getting a bob a day. England needs you ; you are masters. Why don't you strike at this critical moment ? . . .
>
> " Zero hour is at hand. Agonies, mutilation, and death are within a few yards of you . . . there are no flags or trumpets to inspire you. . . .
>
> " One more minute and you will stand up and walk into it. My lads, it's for England !

" When Capt. Nobbs was hit, he says, he remained perfectly conscious :—

> " ' I remember distinctly clutching my head and sinking to the ground, and all the time I was thinking " So this is the end—the finish of it all ; shot through the head, mine is a fatal wound." . . .
>
> " ' The blackness which was then before me underwent a change. A voice from somewhere behind me said, " This is death, will you come ? "
>
> " ' Then gradually the blackness became more intense. A curtain seemed to be slowly falling. There was space ; there was darkness, blacker than my blindness. Everything was past. There was a peacefulness, a nothingness, but a happiness indescribable. . . .
>
> " ' But the voice I had heard seemed to be waiting for an answer. I seemed to exert myself by a frantic effort, like one in a dream who is trying to awaken.
>
> " ' I said, " No, not now ; I won't die." Then the curtain slowly lifted, my body moved, and I was moving in it. I was alive ! ' . . . "

In the *Daily Mail* of Mar. 22, 1918, there was an account (headed " An Airman's Feelings ") of an interview with a scout pilot from which we abstract the following :—

" It is strange, but in the moments before an imminent ' crash ' the mind is generally quite clear and collected. A pilot who was nearly killed in a terrible accident remarked afterwards, ' All I did was to say to myself, ' Won't the poor kid be lonely ! ' I was sure I was going to be killed—there seemed no chance of escape from death—and as the ground grew nearer and nearer I was just shaking my head

to myself in a ' dear me ' sort of style, thinking of my girl in England ! '

" Some airmen look at the ground and wonder which spot they are going to hit ; others wonder what the noise will be like. Almost invariably you hear the remark, ' I didn't feel a bit afraid. I was not a bit worried.' Perhaps the brain is hypnotised by a kindly Providence and terror is replaced in the mind by calm thoughts."

That Natural Instinct is a Perfectly Trustworthy Guide

" There can be no greater popular error than the supposition that natural instinct is a perfectly trustworthy guide, for there are striking contradictions to such an opinion in individuals of every description of animal. The most that we are entitled to say in any case is, that the prevalent instincts of each race are trustworthy, not those of every individual. But even this is saying too much, because when the conditions under which the race is living have recently been changed, some instincts which were adapted to the old state of things are sure to be fallacious guides to conduct in the new one. A man who is counted as an atrocious criminal in England, and is punished as such by English law in social self-defence, may nevertheless have acted in strict accordance with instincts that are laudable in less civilized societies."—Sir Francis Galton, F.R.S., p. 43, *Inquiries into Human Faculty*.

That the Sight of Savages is Superior to that of Civilized Peoples

" Notwithstanding many travellers' tales, I have thus far been unsuccessful in obtaining satisfactory evidence of any general large superiority of the senses of savages over those of civilized men. My own experience, so far as it goes, of Hottentots, Damaras, and some other wild races, went to show that their sense discrimination was not superior to those of white men, even as regards keenness of eyesight. An offhand observer is apt to err by assigning to a single cause what is partly due to others as well. Thus, as regards eyesight, a savage who is accustomed to watch oxen grazing at a distance becomes so familiar with their appearance and habits that he can identify particular animals and draw conclusions as to what they are doing with an accuracy that may seem to strangers to be wholly dependent on exceptional

acuteness of vision. A sailor has the reputation of keen sight because he sees a coast when a landsman cannot make it out; the fact being that the landsman usually expects a different appearance to what he has really to look for, such as a very minute and sharp outline instead of a large, faint blur. In a short time a landsman becomes quite as quick as a sailor, and in some test experiments [Gould's *Military and Anthropological Statistics*, p. 530, New York, 1869] he was found on the average to be distinctly the superior."—Sir Francis Galton, F.R.S., p. 22, *Inquiries into Human Faculty*.

"The tales which have so frequently been told by travellers about the marvellous acuity of vision among primitive peoples unquestionably depend not on a vastly superior visual acuity, but on the power of interpreting signs which are meaningless to the European and hence escape his notice. For when the E. test which we have just described is applied to primitive folk, the results show a visual acuity which is not very different from, though perhaps on the whole slightly superior to, the acuity if Europeans living a corresponding out-of-door life."—Chas. S. Myers, M.D., Sc.D., F.R.S., p. 94, *Experimental Psychology* (1912).

"We may apply the same explanation to the results obtained by determining the size of the Müller-Lyer illusion in civilized and savage communities. Among very primitive peoples, *e.g.*, those of the Torres Straits, the illusion turns out to be distinctly smaller than in England, while less primitive peoples, *e.g.*, the Todas of Madras, stand midway, in size of the illusion, between the Torres Straits Islanders and Englishmen."—*Ibid*, *p.* 54.

"It is familiar to everyone that watchmakers and engravers are liable to be short-sighted, whilst men living much out of doors, and especially savages, are generally long-sighted. It is a singular and unexpected fact that sailors are inferior to landsmen in the mean distance of distinct vision. Dr. B. A. Gould (*Sanitary Memoirs of the War of Rebellion*, 1869, p. 530) has proved this to be the case; and he accounts for it by the ordinary range of vision in sailors being 'restricted to the length of the vessel and the height of the masts."—Chas. Darwin, p. 49, *Descent of Man*.

The following quotations are from *Idle Days in Patagonia*, by W. H. Hudson.

". . . they [our school masters] have taught us an error,

namely, that savages are our superiors in visual power, and that the difference is so great that ours is a dim decaying sense compared with their brilliant faculty, and that only when we prospect through powerful field-glasses do we rise to their level and see the world as they see it. The truth is that the savage sight is no better than ours . . . Possibly then the beginning of the error was in this preconceived notion, that greenness and the absence of artificial light, with other conditions of primitive life, kept the sight from deteriorating. . . . The secret of the difference is that his eye is trained and accustomed to see certain things, which he looks for and expects to find. Put him where the conditions are new to him and he will be at fault . . . If one had set him to find a reversed little *s* in the middle of a closely printed page the tears would have run down his bronzed cheeks, and he would have abandoned the vain quest with aching eyes. Yet the proof reader can find the little *s* in a few moments without straining his eyesight." According to this writer, Humboldt is responsible for circulating this error when he wrote of the " miraculous sight of South American savages."

The late Dr. W. H. R. Rivers, M.D., F.R.S., wrote on Dec. 4, 1916, " I have written on the ' sight of savages ' in the following publications :—

Report of the Cambridge Expedition to Torres Straits. Vol. II., p. 12 (1901). *On the Senses of the Todas* in the *Brit. Jour. of Psychology*, Vol. I., part 4. *Observations of the Vision of the U——— and S———*, Bulletin of the Madras Govt. Museum, 1903, Vol. V., p. 3.

" You will find the subject treated in *Studies of Questions Relating to Eye-training* (1914), by Prof. W. Phillips."

See also *Notes and Queries* :—

Dec. 30, 1916, p. 536 ; Jan. 6, 1917, p. 16 ; Mar. 31, 1917, p. 259.

Vide *Nature*, Oct., 7, 1922, p. 486.

That Blind Persons Acquire, in Compensation for the Loss of their Sight, an Increased Acuteness in their Other Senses

> *" Dark night, that from the eye his function takes,*
> *The ear more quick of apprehension makes ;*
> *Wherein it doth impair the seeing sense,*
> *It pays the hearing double recompense."*
> A Midsummer Night's Dream, III., ii., 177.

" Blind persons are reputed to have acquired in com-

pensation for the loss of their eyesight an increased acuteness in their other senses; I was therefore curious to make some trials with my test apparatus, which I will describe in my next chapter. I was permitted to do so on a number of boys at a large educational blind asylum, but found that, although they were anxious to do their best, their performances were by no means superior to those of other boys. It so happened that the blind lads who showed the most delicacy of touch and won the little prizes I offered to excite emulation barely reached the mediocrity of the various sighted lads of the same age whom I had previously tested. I have made not a few observations and inquiries, and find that the guidance of the blind depends mainly on the multitude of collateral indications to which they give much heed, and not in their superior sensitivity to any one of them. Those who see do not care for so many of these collateral indications, and habitually overlook and neglect several of them. I am convinced also that not a little of the popular belief concerning the sensitivity of the blind is due to exaggerated claims on their part that have not been verified."—Sir Francis Galton, F.R.S., *Inquiries into Human Faculty*, p. 21.

Although Shakespeare, as usual, supports the popular fallacy by the quotation given at the beginning of this article, we find him 'recording' the opposite effect in *King Lear*, IV., vi., 3:—"Hark, do you hear the sea?" To which Gloucester, who is blind, replies, "No truly." Edgar: "Why, then your other senses grow imperfect by your eyes' anguish." Gloucester: "So it be indeed."

The late Sir C. Arthur Pearson, of St. Dunstan's Hospital for Blind Soldiers, who was himself blind, said that the other faculties of the blind are not better than those of people having normal sight.—(*Daily Mirror*, Oct. 15, 1920, p. 7.)

That a Good Mathematician is probably also a Good Chess-player (if one at all!), and vice versa

That there is a close connection between mathematics and chess is an almost universal belief. Almost all renowned chess-players have at one time or another been said to be good mathematicians. However, in his presidential address to the British Association meeting held in Manchester in Sept., 1915, and reported in *Engineering* of Sept. 10, 1915, Sir Arthur Schuster, D.Sc., F.R.S., the celebrated mathematical physicist, said, "Mathematics and chess-playing have

little in common. Nor have, we might interpose, mathematics and strategy and tactics. Moltke is often described as a marvellous chess and whist-player ; he was neither." p. 267.

That Mankind can be Sharply Separated into so many Classes of Ability

" At all events this is a more promising line of investigation than the older one which had for its object the classification of individuals under different types. That kind of work, though far from dead, is fast falling into discredit. It selects extreme cases, extreme cases of vividness (or absence) of visual imagery ; extreme cases of development (or lack) of musical ability, and the like—and calls them types. It is based on the popular notion that mankind can be sharply separated to so many classes or species corresponding to these types. But there is no evidence in favour of the view that any community contains distinctly different species of individuals. We do not find gaps between extremely vivid imagery and its absence, between extreme musical ability and its absence, or between the idiot, the normal, and the genius. So far as we can see, mental variations are as a rule continuous ; the intermediate conditions are indeed far commoner than the extreme types."—Chas. S. Myers, M.D., Sc.D., F.R.S., *Introduction to Experimental Psychology*, 1912, p. 148.

Sir Arthur Schuster, D.Sc., F.R.S., in his presidential address to the British Association meeting in Manchester in Sept., 1915, said it was a fallacy to think that special gifts are associated with special occupations.

That the Human Eye is a Perfect Optical Instrument

" . . . we know what Helmholtz, the highest authority in Europe on the subject, has said about the human eye ; that if an optician had sold him an instrument so carelessly made, he would have thought himself fully justified in returning it."—Chas. Darwin, p. 672, *Descent of Man.*

" . . . while there is no structure in the whole human anatomy which exhibits so abundant a profusion of marvels as the eye, there is perhaps none which is marked with imperfections so striking.

" Many of its defects are the more striking because they are so obvious, being such as would never be tolerated in

optical instruments of human manufacture. In any fairly good camera or telescope or microscope we should expect to find that the lenses were symmetrically figured, free from striæ and properly centred; also that they were achromatic and efficiently corrected for spherical aberration. In the eye not one of these elementary requirements is fulfilled.

"The aqueous surface of the lens formed by the aqueous humour and the cornea is not a surface of revolution, such as would be fashioned by a turning-lathe or a lens-grinding machine; its curvature is greater in a vertical than in a horizontal direction and the distinctness of the focal image is consequently impaired. Again the crystalline lens is constructed of a number of separate portions which are imperfectly joined together. Striæ occur along the junctions and the light which traverses them instead of being uniformly refracted is scattered irregularly. Moreover, the system of lenses is not centred upon a common axis; neither is it achromatic, while the means employed for correcting spherical aberration are inadequate. The purchaser of an optical instrument which turned out to have such faults as these would certainly, as the late Prof. Helmholtz remarked, be justified in returning it to the maker and blaming him severely for his carelessness."—Shelford Bidwell, M.A., F.R.S., p. 35, *Curiosities of Light and Sight.*

"Of all the sense organs the eye is the worst planned, and has the most serious inherent defects."—Prof. F. Womack, M.B., B.Sc., to Hamp. Sc. Soc., Dec. 1, 1916.

That Telepathy is an Established Fact

To hear some people talk of telepathy would make most of those who have not a knowledge of the elements of physical science think that telepathy had been as firmly established in the realms of knowledge as telegraphy (both with and without wires) and the telautograph, but for any subject to be so safely established it is necessary that all the experimental work carried out in connection with it should be done under strictly scientific conditions; that these and all the experiments should be equally scientifically and fully described, so that the whole of the work may be repeated with certainty by other experimenters. The experiments and the methods of carrying them out and describing them should not be open to the most obvious criticism. Now few people have the patience and the necessary scientific knowledge

and skill to carry out research work properly, and to save themselves the trouble of doing this, and *wanting to believe*, they accept telepathy and many other things without more to-do.

As an illustration of unscientific cock-sureness we quote the following paragraph from a one-column article on "Telepathy" in the *Daily Mail* of May 17, 1916, by Mrs. Beatrice Heron Maxwell :—

"We know that the living can send their thoughts and emotions to others, as a wireless telegram travels through space to a receiving station, or can so imbue a place and a thing with their own feelings that when we approach the zone we are more or less conscious of the clinging influence."

(*Vide* "Phantasms of the Living," by T. W. Mitchell, *Nature*, Feb. 17, 1923, pp. 211-2).

Now we give the other picture, for at last a man with all the necessary qualifications has taken up the matter on the lines just indicated. Even then the work would probably not have been carried out—at least so completely—had it not been for the munificence of Mr. T. W. Stanford, who has provided about £600 per annum for the research, the following account of which was given at pp. 135-6 of *Nature* of April 17, 1919 :—

"Experiments in Psychical Research.*

"In 1912, Mr. Thomas Welton Stanford, brother of Leland Stanford, and one of the trustees of the Leland Stanford Junior University of California, placed at the disposal of the University the sum of 10,000*l*., the interest on which was to be applied to investigations in the field of spiritualism and psychical research, and Dr. Jordan, the president of the University, asked if the department of psychology was willing to assume the responsibility of applying the endowment to work in this field. After some natural hesitation and consultation with other universities, the offer was accepted. The endowment sufficed not only to refit and equip the laboratory rooms assigned to the work, but also to defray the expenses of a fellowship, to which Dr. Coover, a trained

* Leland Stanford Junior University Publications. Psychical Research Monograph No. 1, "Experiments in Psychical Research at Leland Stanford Junior University." By John Edgar Coover, Fellow in Psychical Research and Assistant Professor of Psychology. Pp. xxiv. × 641. (Stanford University, California, 1917.) Price, paper 3.50 dollars, buckram 4 dollars.

psychologist, was appointed. The present bulky volume constitutes his first report.

"Part i. deals with the hypothesis of 'thought transference' or telepathy, a subject on which much experimental work has been done, but more, and more carefully controlled, work was urgently needed. Three sets of experiments were carried out:—(1) On the guessing of lotto-block numbers; (2) on the guessing of playing-cards; (3) on the 'feeling of being stared at.' The playing-card experiments were very extensive, and deserve a longer notice than we can give them. The following was the method:—(i.) The experimenter shuffles the pack (court cards discarded). (ii.) He throws a die. If the number thrown is odd he holds the card in his mind, the form of content being: for 1, visual impression; for 2, kinæsthetic imagery (incipient pronouncing); for 3, combined visual impression, kinæsthetic image, and auditory image. (For even numbers, see below.) (iii.) He turns over the pack, notes the bottom card, taps once to signal the reagent, holds mental content of card, and 'wills' the content to be projected into the mind of the receiver. After fifteen or twenty seconds he taps twice to signal the close of the experiment, and, when he notes that the reagent has recorded his guess, himself records colour, number, and suit of the card and number of the die determining the form of the experiment. When the die threw an even number the experimenter ran off the rest of the experiment as usual, but *did not look at the card until the reagent had recorded his guess*, thus affording an effective series of control experiments. The results of 10,000 guesses with University students, favourably disposed, were entirely negative. No statistical analysis shows any deviation in the percentage of right cases exceeding the probable limits of pure chance, or any tendency for the guesses to be more correct when the reagent graded his answers high (indicating considerable confidence that they were right) than when he graded them low. A further set of experiments was made with ten 'sensitives,' five of them 'spiritistic mediums,' persons with a sincere faith who gave time and effort to the research without pay. The statistical analysis of the results of 1,000 experiments revealed no advantage for psychics over normal reagents; there were no deviations in right guesses beyond the limits of chance.

"The experiments conducted to test the common belief

in sensitiveness to being stared at were equally negative in their results, ' regular ' and ' control ' experiments being determined in the same way by the throw of a die. A shorter series, in which a single ' starer ' was replaced by twelve ' starers,' gave no more definite result. In this series the twelve ' starers " were told in the control experiments to image a black cat on the lecture-table. None of the reagents ever thought of black cats. . . .

" That the authorities of the Leland Stanford Junior University should have had some hesitation in accepting the offered endowment will, we think, be readily understood. That Dr. Coover has justified his appointment will, we hope, be agreed. He has presented the results of a series of very careful investigations, organised by a trained worker, which, even if, as in the case of the ' card guessing ' experiments, they only justify the scepticism of the sceptics, do something at least to clear the field. It may be noted that Prof. Pearson's ' Tables for Statisticians and Biometricians ' (Cambridge University Press), of the existence of which Dr. Coover seems to be unaware, would have saved him considerable arithmetical work in comparing observed with theoretical distributions."

That, without seeing it, persons can tell when they are being stared at by someone behind them.

This matter has been experimentally and exhaustively treated by Dr. J. E. Coover who issued his report in 1917, and this was reviewed at p. 136 of *Nature* for Apr. 17, 1919. This review has been quoted in dealing with the immediately preceding fallacy.

That the Seat of our Affections is our Heart

We frequently hear it said that women are more guided by their hearts than their heads, and that Matilda gave her heart to Algie, and so on. To what extent the sayers of these sayings could support their statements if cross-examined upon them, the author does not know, but that the idea is almost universal few will dispute. The author does not wish to be taken too seriously on such a delightful subject, but he is sure his readers will be amused by the following extract from Charles Lamb's essay on Valentine's Day: " In these little visual interpretations, no emblem is so common as the heart—that little three-cornered exponent

of all our hopes and fears—the bestruck and bleeding heart ; it is twisted and tortured into more allegories and affectations than an opera hat. What authority we have in history or mythology for placing the headquarters and metropolis of god Cupid in this anatomical seat rather than in any other is not very clear ; but we have got it, and it will serve as well as any other. Else we might easily imagine, upon some other system which might have prevailed for anything which our pathology knows to the contrary, a lover addressing his mistress, in perfect simplicity of feeling,—' Madam, my *liver* and fortune are entirely at your disposal ' ; or putting a delicate question, ' Amanda, have you a *midriff* to bestow ? ' But custom has settled these things, and awarded the seat of sentiment to the aforesaid triangle, while its less fortunate neighbours wait at animal and anatomical distance."

That it is a relatively Easy Thing to Estimate a Person's Intelligence by Looking at Him

Many of us, voluntarily or for business reasons, undoubtedly do estimate people's ability by looking at them, but as a rule we converse with them at the same time, so that probably our judgment is based on far more than mere appearances.

" There is a general belief that it is a relatively easy problem to estimate a person's intelligence by looking at him ; and teachers, physicians, and employers are often compelled to make judgments as to the intelligence of a given person with no more data than can be obtained from a rapid survey of his appearance ; hence such phrases as ' he looks bright ' or ' he looks stupid.' Even in the law courts rough estimations of intelligence are sometimes required. In the *Psychological Review* (vol. xxv., No. 4), Mr. R. Pinter gives the results of an investigation he made for the purpose of testing the trustworthiness of these judgments. The author chose twelve photographs of children varying in intelligence from proved feeble-mindedness to unusually great ability, and asked groups of people to arrange the photographs in order of merit for intelligence. His groups consisted of physicians, psychologists, teachers, and miscellaneous people. He found that the group of psychologists was the most nearly correct, but that on the judgment of no one group or of no one person could any reliance be placed. Several observers were consciously influenced by children

of their acquaintance whom a photograph happened to resemble, and irrelevant trivialities quite frequently biased the observer's judgment. The author concludes that, although perhaps a living person would be easier to judge than a photograph, nevertheless these haphazard judgments are too untrustworthy to be of practical value ; and that, whether the observer be a teacher, physician, or employer, it would be better to use objective standards, and he recommends that the use of mental tests should be considerably extended." —*Nature*, Oct., 1918, p. 151.

That Electric Light *per se* is Bad for our Eyes

We have not heard so much about this lately, but in the early days of electric light it was a very common statement.

Mr. James Aitchison, the optician, of 428, Strand, London, W.C., wrote as follows to the *Evening News* of July 31, 1905 :

" Dr. Allan Wilson's broad statement before the Public Health Congress that the electric light did a large amount of harm to the eyes is liable to give unnecessary alarm to the public. It has been to some extent admitted that the ultra-violet or chemical rays of the electric arc and naked filament lamps are irritating, but the same is said of incandescent gas mantle. The ordinary incandescent (electric bulb) lamp is practically harmless when protected by frosted glass. The cases where defective eyesight is attributed to such lights are invariably explainable on other grounds, chiefly that in big towns ventilation and daylight exist in inverse proportion to the use of such lamps. It is the absence of healthy surroundings that is the real factor. Hygienically the superiority of electric incandescent lamps as illuminants over any combustion lamps, which must needs deteriorate the air, is overwhelming."

In August, 1913, an International Congress of Medicine was held in London, and in the *Daily Mail* of Aug. 5, 1913, in referring to this Congress the following paragraph occurred :

" The injurious effects of bright lights on the eyes will be dealt with by Prof. von Hess, of Wurzburg. The fear that injuries are produced by bright modern lights is groundless, Dr. von Hess thinks, except when the lamps are improperly hung ; but people working for a long time in lights rich in ultra-violet rays should wear protective glasses."

That one mind is as likely as another to make Discoveries and Advances in the Realms of the Unknown

The Report of the President of the Carnegie Institution of Washington for the year ended Oct. 31, 1917, is written in a racy manner and was quoted at p. 196 of *Nature* of May 9, 1918, from which we extract the following :—

"In dealing with these aberrant types there are encountered certain other fallacies of a more specious, and hence of a more troublesome, character. They arise out of the prevailing innocence of, if not contempt for, the doctrine of probabilities. The simplest of these fallacies is seen in the common belief that one mind is as likely as another to make discoveries and advances in the realms of the unknown. Thus it is assumed that research establishments should maintain experts, or corps of them, for the purpose of promoting the efforts of tyros, amateurs, and dilettanti, or, in other words, perform the functions of elementary schools. A subtler fallacy is expressed in the more common belief that a research organisation should occupy itself chiefly in soliciting and in examining miscellaneous suggestions. It is held that if these are received in large numbers and if they are read long enough and hard enough, the possibilities of knowledge will be completely compassed. The worst of all these fallacies is found in the not unpopular notion that if experts could be set at work under the direction of inexperts great progress could be achieved. This is the fallacy so often used to justify placing technical work under the administration of politicians and promoters rather than under the charge of competent men. It finds frequent expression also in suggestions to the institution that its corps of investigators might avoid the dangers of "respectable mediocrity" by yielding to the requests of the less conservative and more brilliant advocates of advancing knowledge."

That Blind Men do not Smoke

There is little doubt but that the sense of taste is assisted in some manner by the sense of sight, though it is possible to taste in the dark, as the author's experiments have shown, but most smokers obtain less satisfaction from smoking in the dark, especially when they cannot even see the light of their pipe, cigar, or cigarette. A distinction must be made between simple smoking, and smoking with inhaling—in which some

of the smoke is carried down the bronchial tubes and into the upper parts of the lungs, for some cigarette smokers who do inhale tell me that being in the dark makes no difference to their smoking.

The author has seen several blind men smoking, and Mr. C. E. Wallis, M.R.C.S., tells him that many of the blind soldiers at St. Dunstan's Hospital smoke.

"THE BLIND MAN'S PIPE.

"That blind men do not enjoy smoking is a belief as widespread as it is false.

"The reason is not far to seek. Try to smoke your pipe in a dark room, avoid using the glow of the bowl as a guide, and you will find it difficult to tell after a few minutes whether your pipe is out or burning furiously. The burning weed seems to have lost both taste and aroma.

"In the case of the blind there is probably a more acute appreciation of the fumes than the ordinary man enjoys. At the same time, the eye being quicker than the palate in perceiving whether the pipe be lit or unlit, a blind man may for a short time puff contentedly at a pipe which has gone out. It may be to avoid this that blind men smoke faster than those who have their sight."—*Tit Bits*, June 8, 1918.

That nearly all Persons who are Blind were Born so

Dr. F. E. Rose, Ph.D., M.A., at the Child Study Soc., London, on Nov. 19, 1908, said, "Only 4 per cent. or 5 per cent. of blind people are born blind."

That the Indian "Rope Trick" has in fact been performed in the Manner Usually Described

"I CAN'T BELIEVE MY EYES

By a Sergeant of the East Surreys

"Till August 4, 1914, I had always been a home bird, living close to London and engaged as a clerk. My experience of Eastern lands was nil. I had heard about the strange tales and mysteries of the East, but, frankly, I regarded these as all trickery and moonshine. Now I don't know what to say—what to think!

"I enlisted four days after war came. I joined the East Surreys, and was sent off to India with my battalion. My amazement began as soon as I landed.

"We had been only two days in Ferzapore when there came one morning into the barrack square an old Hindu. He had a little basket, a long thick rope thrown across his shoulder, and two young lads with him. The trio held out their hands for backsheesh, and we gave them annas liberally —being new to the game. Then the performance began.

"The old man suddenly, without a word, threw one end of the rope up into the air, and it remained taut and firm, standing up from his hand as if pulled tight by an invisible arm in the sky. We clearly saw the end of the rope up there above. Then one of the lads swarmed hand over hand up the rope till he reached the top. I saw it, I tell you ! Then the boy slid down, the man said a word or two in Hindustani, and the rope fell limp !

"*How* was it done ? Two score of us East Surreys saw it all. But it was a marvel to us, and is yet."—*Daily Mail*, Jan., 8, 1919.

Letters then no doubt poured into the *Daily Mail* offices, and some of these were published : on Jan. 10, there were three published ; on Jan. 13, two of which one was the following :—

"Sir,—For at least 500 years the rope trick has been an Indian fable. No Oriental performer who has visited Europe —and there have been, and are, plenty of them—has ever performed it. No conjurer who has visited India in quest of the trick has ever seen it.

"When our King went to India, as Prince of Wales, in 1902, that country was scoured to find a performer who could do it ; Lord Lonsdale offered £10,000 for a sight of it ; Messrs. Maskelyne and Devant had for years a standing offer of a princely remuneration to anyone who would come and do the trick in London. Reward and salary are still unclaimed.

"Only a few weeks ago an eminent member of the medical profession who has spent years in India lectured on this and other traditional Indian tricks to the members of the Magic Circle—his verdict was hallucination.

"S. W. Clarke,
"Editor of the *Magic Circular*.
"Anderton's Hotel, Fleet Street, E.C."

On Jan. 15, one from Lt. F. W. Holmes, V.C., M.M., Yorkshire Regt., who stated that he had seen the trick performed in India in June, 1917, and that he had *photographed*

it, and in the *Daily Mail* of Apr. 26, 1919, one of Lt. Holmes' photos was reproduced. This appears to have been taken in a perfectly clear atmosphere: there is no suspicion of smoke, and the 'boy' at the top of the 'rope' is apparently as well developed an adult as the one at the other end of the 'rope' and holding it up. The position of the top 'boy's' feet, legs, hands, and the small of his back (he is leaning well back on to the top of the 'rope' and grasping it with both hands placed at his back); the fact that this boy's mass centre is vertically above the lower end of the 'rope,' the bent, noded and *tapered* (small end at the top) 'rope,' and the position of the lower end of it (apparently supported by some form of belt round the lower man's waist), all point to this 'rope' being a bamboo about 11 ft. long. At the foot of the photo it is stated, "... the rope, which the performer subsequently coiled round his waist, looks like a slightly bent pole." As to the "coiling," it is difficult for the author to criticise, as unfortunately no photo was published to show this, but it is *conceivable* that the bamboo might be mechanically jointed and have a slack rope inside it, so that the sections could be pulled apart and left strung on the rope; they could then be coiled round the waist. If this is the explanation, the workmanship must be excellent, for the curvature of the 'rope' with the boy at the top of it is *very even and slight*, whereas an artificially jointed bamboo would probably show a discontinuous curve, and more total curvature.

On Jan. 18, 1919, another letter was published. On Jan. 20, Mr. Nevil Maskelyne, the conjurer, wrote as follows:—

"Sir,—There appears to be some misconception as to what is meant by this title. The fact is that there are two possible meanings, and between the two the public becomes confused.

"There are a legendary and an actual 'rope trick.'

"The legendary trick is supposed to consist in throwing a rope into the air, where it remains suspended; a boy climbs up the rope and vanishes at the top. This has never been seen, because the feat has never been accomplished.

"The actual trick consists in elevating a 'fake' resembling a rope and letting a boy climb up it.

"This is the feat which Lieut. Holmes, V.C. (who stated in a letter to the *Daily Mail* that he had taken a photograph

of such a performance), has photographed. Obviously it is not the rope trick of the Indian legend.

"The 'hypnotic' hypothesis had its origin in a short story published in the *Detroit Free Press* years ago. It was a work of pure fiction, but was repeated in various publications throughout the world as a matter of absolute fact. This has been made known again and again.

"But give a lie twenty-four hours' start and the truth will never overtake it.

"NEVIL MASKELYNE.

"St. George's Hall, Langham Place, W. 1."

This is important, and the "fake" agrees with the author's interpretation of the photo published three months after Mr. Maskelyne's letter.

On Jan 23, another letter was published. On Jan. 25, an even more startling variant of the trick was published which space will not permit of reproduction here. It was taken from the *Civil and Military Gazette* of Lahore, 1898. Another letter was published on Jan. 31, and on Feb. 4, 1919, the following one which seems as definite as that of Lt. Holmes !—

"SIR,—The many letters on this subject in the *Daily Mail* have interested me very much.

"I lived for fourteen years in India, and have travelled through the length and breadth of the country, from Quetta, in Baluchistan, to Colombo, and from Mussoorie, in the Himalayas, to the Nilgherries. I could speak Hindustani fluently, and have had long conversations with conjurers attached to the Maharajahs of Patiala, Kapurthala, and Mysore; but I have *never* seen the rope trick and I have never met any Anglo-Indian who has seen it.

"A native at Bangalore showed me how the mango trick was done, and very clever it was, but no rope trick.

"SYDNEY ARTHUR VIPAN.

"Oakley House, Bloomsbury Street, W.C. 1."

On Feb. 5, two letters were published, one as clearly against the existence of such a trick as the other is for it !

Yet others on Feb. 7 and 10. In the issue of Feb. 19, there was a short article from a native Indian strongly asserting the existence of the trick. While at p. 487 of *Nature*, of Feb. 20, 1919, the following article appeared :—

"THE INDIAN ROPE TRICK.

"The recent correspondence in the *Daily Mail* relating to the Indian rope trick is very similar to the controversies that have arisen from time to time in the Press in India, but nothing said seems to advance the evidence a jot further. The man who does the rope trick has yet to be produced!

"During a considerable portion of a residence of more than thirty years in India, I studied Indian conjuring and made all the inquiries I could regarding this trick. I knew many of the best conjurers between Calcutta and Delhi, but never found one who had seen the rope trick. Several had heard of it, some believed in it, none could satisfactorily explain it.

"Personally, I am of opinion that the rope trick is entirely mythical. I decline to accept the various theories put forward by amateurs in support of its practicability, such, for example, as hypnotism or substitution. The most likely explanation I have heard is that the trick is performed in a courtyard, that smoke obscures the view above, and that the rope is actually thrown up to a confederate, who fastens it to a beam which cannot be seen on account of the smoke; a lad then climbs up the rope and is similarly lost to view in the smoke, but even this theory is unlikely. It would not be impossible to arrange a scene on a stage where the rope trick could be performed as an illusion—not by a smoke screen, but by other means of hiding what happens above a certain height.

"As to Indian conjuring generally, I consider it to be far behind European, though the sleight of hand is often extraordinarily good, and the methods occasionally ingenious, as, for instance, when conjurers apparently cause a few grains of wheat or gram to sprout in a few moments—a far better illusion that the overrated mango-tree trick.

"Indian conjurers are very conservative and seldom produce new tricks, and they are very slow in discovering how a trick, new to them, is done even when performed by an amateur on well-known principles.

"Hemel Hempstead, Herts. G. HUDDLESTON."

That the Character of a Person can be Correctly Told from the Prominences of his Skull

In *Nature* of July 21, 1921, p. 644, there is a review of a book by Dr. B. Hollander, in which review it is said, "From

these attempts to localise the higher mental functions before the nature of cerebral physiology was at all understood arose the cult of phrenology and all the charlatanism to which it gave rise.

" To the serious student, phrenology, the lore of telling the character from the prominences of the skull, became quickly discredited, because it was obvious that, as the thickness of the skull bones varied irregularly, the external configuration of the skull bore no definite relation to the surface of the brain underneath. This circumstance did not interfere with the followers of the mental localisation theory, but they themselves soon began to experience difficulties of their own. . . .

" A great deal of knowledge has now accumulated, and modern opinion, which is supported by the vast amount of detail derived from the many cases of head injury in the war, is very definitely against any possible cortical localisation of separate mental faculties."

That Man Possesses a Free Will

" Many years later I was so harassed with the old question of Determinism, which would leave every human action under the control of Heredity and Environment, that I made a series of observations on the actions of my own mind in relation to Free Will. I employ the word not merely as meaning ' unhindered ' but in the *special* sense of an *uncaused* and *creative* action. It was carried out almost continuously for six weeks, and off and on for many subsequent months.* The procedure was this—Whenever I caught myself in the act of what seemed to be ' Free Will ' in the above sense, I checked myself and tried hard to recollect what had happened before, made rapid notes, and then wrote a full account of the case. To my surprise, I found, after some days' work, that the occasions were rare on which there seemed room for the exercise of Free Will as defined above. I subsequently reckoned that they did not occur oftener than once a day. Motives for all the other events could be traced backwards in succession, by orderly and continuous steps, until they led into a tangle of familiar paths. It was curious to watch the increase of power given by practice, of recalling mental actions which being usually overlooked give the false idea

* Psychometric Experiments, Free Will (*Brain*, Vol. II.), 1879.

that much has been performed through a creative act, or by inspiration, which is really due to straight-forward causation. The subject is too complex to be more fully gone into here; I must refer to the Memoir itself. The general result of the inquiry was to support the views of those who hold that man is little more than a conscious machine, the slave of heredity and environment, the larger part, perhaps all, of whose actions are therefore predictable. As regards such residuum as may not be automatic but creative, and which a Being, however wise and well-informed, could not possibly foresee, I have nothing to say, but I found that the more carefully I inquired, whether it was into hereditary similarities of conduct, into the life-histories of twins, or introspectively into the actions of my own mind, the smaller seemed the room left for this possible residuum." —Sir Francis Galton, Sc.D., F.R.S., *Memories of My Life* pp. 295-6.

That a Person Cannot be Hypnotised Except the Hypnotist Exert Great Will Power

"I afterwards practised at home, and magnetised some eighty persons in this way; but it is an unwholesome procedure, and I have never attempted it since. One experience was, however, of interest. I had been assured that success was the effect of strength of will on the part of the magnetiser, so at first I exerted all the will-power I possessed, which was fatiguing. I then, by way of experiment, intermitted a little, looking all the time the same way as before, and found myself equally successful. So I intermitted more and more, and at last succeeded in letting my mind ramble freely while I maintained the same owl-like demeanour. This acted just as well. The safe conclusion was that the effect is purely subjective on the part of the patient, and that will-power on the part of the operator has nothing to do with it."—Sir Francis Galton, Sc.D., F.R.S., *Memories of My Life,* p. 80.

That the Sight of a Sailor is Better than that of a Landsman.

"A seafaring man on board a ship at sea sights land in the far distance, and calls the attention of a landsman to it, pointing out the direction in which it lies. The landsman looks in that direction, but he cannot see the land, which is plain enough to the seafaring man. This is a common

experience, and is usually explained by supposing that the sailorman has the better sight, that his vision is more acute. This need not be so, and in many cases is certainly not so. The landsman may have vision as good or even better than that of the seafaring man, but yet he cannot see what the seafaring man sees plain enough. The reason is that the landsman does not know what to look for, and is looking for the wrong thing. . . . "—Dr. Charles A. Mercier, M.D., F.R.C.P., F.R.C.S., *Spiritualism and Sir Oliver Lodge*, p. 26.

Vide also *Sight of Savages.*

That the Hon. Mrs. Victor Spencer about the year 1919 painted a "Spirit" Picture of Christ, and that Spirit Photographs are Genuine and Reliable.

"Mrs. Victor Spencer, daughter-in-law of Viscountess Churchill, in a telegram from 93, Promenade des Anglais, Nice, to the *Daily Mail*, denies statements printed in our issue of Tuesday that her painting 'The Light' is a spirit picture.

"The statements Mrs. Spencer refers to were, apparently:—

"1. By Sir A. Conan Doyle, who, in a letter, said the picture was 'a supreme example of the working of spiritual intelligence through a material mortal frame.'

"2. By Viscountess Churchill, who said: 'I cannot explain it except to express my belief that Mrs. Spencer has strong psychic power.'

"Mrs. Spencer adds that she claims no psychic power whatever, and that the picture was painted in a normal manner, but without previous training."—*Daily Mail*, Dec. 20, 1919.

"From Major the Hon. Victor Spencer.

"Sir,—I should like to make a final effort to clear up the misconception still continuing in the mind of the public concerning a supposed 'spirit' picture painted by the Hon. Mrs. Victor Spencer.

"In the *Daily Mail* of December 16, Sir Arthur Conan Doyle stated that this picture was 'the finest head of the Founder of Christianity that has ever been conceived.' He continued further to the effect that it had been painted in a few hours by a lady who had 'no power of artistic expression in her normal condition,' and referred to 'a great

painter in Paris who, when he saw the companion full-face drawing, fell instantly upon his knees.'

" It is frequently observed that for anyone who sets out to investigate ' psychic phenomena ' the way is beset by pitfalls. Sir A. Conan Doyle evidently has the idea that he can avoid them by first blindfolding himself and then leaping in the dark. In a word, by discarding all such details as first-hand evidence.

" Anyone reading his remarks would very naturally conclude that he had spoken to, or at least corresponded with, the artist whose pictures he so much admired and about whom he made such startling assertions.

" Not so. When Sir A. Conan Doyle's letter appeared in the *Daily Mail* he had neither met Mrs. Spencer nor corresponded with her ! Had he done so, there are a few things he might have discovered.

" To my wife's knowledge, no one has ever ' fallen on their knees ' before one of her pictures. She has been interested in art since childhood. During the spring and summer of 1914 she executed some five or six oil paintings, pastels, and drawings in a perfectly normal manner. After this followed a period of war work, ambulance driving, during which her painting was laid aside.

" In 1918, she took up her painting again and produced the head of Christ which has caused so much comment. The picture was placed in Walker's Gallery for storage during Mrs. Spencer's absence abroad and that her friends might have the opportunity of seeing it. It was not in any ' exhibition.'

" Mrs. Spencer has been out of England since November, and during her absence and entirely without her knowledge the picture was dragged into the Press and used as an advertisement for spiritualism.

" This publicity, discovered by her by chance in a copy of the Continental *Daily Mail*, is extremely distasteful to her and misleading to the public, more especially as she has no leanings to spiritualism or any other ' ism.'

" Mrs. Spencer wishes definitely to state once and for all that her pictures are painted in a perfectly normal manner, that she is disgusted at having ' psychic power ' attributed to her and that she does not cherish any ludicrous and mawkish sentiments about ' helping humanity ' by her paintings.

"It seems a grave pity, to say the least, that anyone should be exploited against their will in the interests of a propaganda with which they are entirely out of sympathy. It is frequently said that bona-fide scientific investigators of spiritualist phenomena are hampered in their endeavours to reach whatever truth may rest at the core of the matter. If this is a sample of what they encounter, I do not wonder!

"As the late Sir William Crookes, who, it will be remembered, endeavoured to institute serious research, once told me, these matters are surrounded by such a mass of narrow prejudice and hysterical fallacy as to make it well-nigh impossible to place their investigation upon a sane and wholesome basis.

"If this mania for 'spirit' influence which has spread over the country is going to cause its adherents to engulf members of the general public in their hysterical whirlpool of maudlin absurdities, the sooner an anti-'spirit' Mr. Pussyfoot appears on the scene the better for all of us.

"VICTOR SPENCER.

"93, Promenade des Anglais, Nice, Dec. 24."
Daily Mail, Dec. 31, 1919.

There was an admirable article, by C. Marsh Beadnell, at pp. 139-140 of *Nature*, Feb. 3, 1923, the whole of which we should have reproduced but for space, so must be content with the following extracts:—

". . . when trickery is precluded, there were no spiritualistic phenomena of any kind. . . ."

"'Of all spiritualistic phenomena,' says Mr. W. Whately Smith, spirit-photographs are the most obviously fraudulent.' . . ."

"The spirit-photographer Buguet was eventually detected and sentenced to twelve months' imprisonment and a heavy fine."

". . . Mr. C. Vincent Patrick, in a careful analysis of *Fairy Photographs*, recently published by Sir A. Conan Doyle, . . . does not hesitate to label the fairies as 'fakes.'" . . . "To Mr. Patrick is due the credit of exposing Mr. Hope, of Crewe, the last and most elusive of the three leading British spirit-photographers. Vearncombe, a member of, and strongly recommended by, the 'British College of Psychic Science,' has also been proved to have tampered with the plates. Remained only Mr. Hope and his assistant, Mrs. Buxton. . . . As a result, Mr. Hope is

found ' guilty of deliberately substituting his own plates for those of a sitter.' "

" The secret, we opine, lies in a defect of education. . . . So long as the young and growing child does not learn *how* to think, there will inevitably be an undue proportion of grown-ups whose pitiful logic consists in drawing false conclusions from unsound premises, and to whom error appears as truth provided it be shouted sufficiently loudly and frequently."

For delightful humour see also the article by Prof. E. N. da C. Andrade, D.Sc., F.Inst.P., on " Occult Phenomena and After-images," at p. 843, *Nature*, Dec. 23, 1922.

" Lecturing on the results of his 30 years' experience among spiritualists, Mr. William Marriott declared at the Eclectic Club, Regent Street, last night, that he was able to produce with the greatest ease any example of ' spirit ' photography required.

" ' In every case of spirit photography I have investigated,' he said, ' I have found that " faking " has been done.'

" The lecturer added that at one séance at which Sir Arthur Conan Doyle was present, he so faked a photograph that he produced a picture in which a band of fairies were seen dancing round Sir Arthur's neck."—*Daily Mail*, Jan. 20, 1922.

Fallacies Connected with Spiritualism

Alas that lack of space will not allow us to deal at all adequately with this most fruitful source of error, trickery, and harm. Under " Spirit Photographs " will be found some information and references. Some other references are :—

Spiritualism and Sir Oliver Lodge, by Dr. Charles A. Mercier, M.D., F.R.C.P., F.R.C.S. (1917), 132 pp.

" Psychic Lights Comedy : Electric Trap for Medium," *Daily Mail*, May 30, 1923.

Letter from Lt.-Col. J. D. Reckitt, M.D., M.R.C.S., in *Daily Mail*, Aug. 14, 1920. Dr. Haydn Brown in *Daily Mail* of Oct. 18 and 20, 1919. A High Court case was reported in the *Daily Mail*, Mar. 16, 1920, in which Mr. Sidney A. Moseley, the representative of the *Sunday Express*, said in evidence that " the medium was able to tell him the dates of various coins in his coat pocket, and was able to describe a coat that hung outside in the hall and which to his knowledge she had not

seen before. That was rather extraordinary, because it was an old naval coat which he had converted to civilian use."

" Mr. Justice Darling : The result was that you believed her to be gifted with supernatural powers ? I believed she had powers which are fairly common in these days. You now know it was a trick ? I know now."

" Sir,—Not a few of your readers will attach some importance to the letter on ' Magic, Mystic 'Fluence ' from your ' Special correspondent.'

" Without wishing to make this subject a matter of correspondence in your columns, I should like to be allowed to meet your correspondent's suspicions with facts above suspicion.

" A business colleague of mine became ill. He left town, and, as I was later given to understand, died.

" The following year I was present at a test séance with the object, among other things, of seeing a ' sister ' from the other side. This expectation having been realised, I was next confronted, unexpectedly, with the ectoplastic materialisation of my old business colleague ! The likeness was beyond dispute, and, by itself, convincingly evidential that our departed friends return after death.

" Sixteen months later, whom should I meet one day at noon in the City but this very business colleague ! He had not died, as I had believed ; but my believing him to be deceased had simply made of me an excellent subject for the deception practised by some disembodied intelligence at the séance. A. C. Norris."

Pall Mall Gazette, Mar. 9, 1923, p. 7.

FALLACIES CONNECTED WITH OURSELVES

(c) OUR DISEASES

That Tomatoes Induce Cancer

Once, when there happened to be an increase in the consumption of tomatoes, it was noticed that there was also an increase in the number of cancer patients, and some illogical people must have associated the two, and said that the one was the cause of the other. No doubt, if we tried, we might find some other data of that period ; such as that the number of things " made in Germany " was greater then

than it had been before, and then we might equally illogically say, " therefore eating tomatoes makes things in Germany ! " However, on inquiring at the Cancer Hospital, Brompton, we were informed that there is no justification for it, and that the patients are regularly supplied with that vegetable when it is in season.

" Cancer is one of the most terrible diseases that medical science has any knowledge of. The very fear of cancer when a tumour has been formed on the tongue or elsewhere has even driven men crazy. Sad to say, it seems to be on the increase in an almost direct ratio to the diminution of cases of consumption. The reason I cannot give. Let me say, however, that *the eating of tomatoes has nothing whatever to do with the production of the disease.* The tomato, if just ripe, and not too ripe, is probably the most health-giving fruit in the kingdom. It sweetens the blood, and I even recommend it in the case of sleeplessness. No tumour should be neglected, however small or however innocent-looking. But it should be shown to a qualified surgeon or physician."—Dr. Gordon Stables, R.N., in the *Yorkshire Weekly Post,* Nov. 21, 1896.

That it is Dangerous to have Flowers in One's Bedroom at Night

There is a saying that " what is one man's poison is another man's food." This may be re-modelled to suit this case into " what is poison to the animal kingdom is food to the vegetable kingdom " ; in other words, the carbon dioxide (same as carbonic acid gas and CO_2) which is given off by the respiratory organs of animals is absorbed (chiefly by the leaves) by plants. The green colouring matter of plants is called chlorophyll (*Gr. chloros,* green ; *phyllon,* a leaf). Now this chlorophyll, under the action of sunlight (diffused or direct, but more particularly the latter), has the property of decomposing the carbon dioxide into its constituent parts, carbon (which is a solid) and oxygen (a gas). The plant retains the carbon, which so largely enters into the composition of wood, but gives off the oxygen, which is the vital element of the atmosphere from an animal point of view. Hence we see we can even reverse the re-modelled saying which we gave above, and state roughly that " what is poison to the vegetable kingdom is food to the animal kingdom," though it is not correct to say oxygen is *poison* to the vegetable kingdom, as we shall see later on.

With regard to the rate at which this action takes place, Sir Edward Thorpe, F.R.S., states that a square metre (about $10\frac{1}{2}$ square feet) of leaf will decompose in sunlight a litre (about $1\frac{3}{4}$ pints) of carbon dioxide per hour, and the quantity of carbon dioxide in the atmosphere is usually about 4 volumes in 10,000 volumes.

Hence, so far as the above process is concerned, flowers with green leaves are distinctly beneficial in a room in the daylight. Now, although it may appear strange, it nevertheless is a fact that a plant is at all times (that is, in the day or night, light or dark) " breathing " in the same sense as we breathe, that is, it is absorbing oxygen and giving off carbon dioxide ; but in the daytime the reverse process, described above, is taking place *to a much greater degree* and this is the reason why it used to be thought that the plant did not breathe in the daytime. This breathing of the plant is a *slight* disadvantage to the air in the room, but it is so very slight, and an ordinary gas- or lamp-flame would produce carbon dioxide at a far greater rate than a good-sized oak tree !

Sometimes the water in which cut flowers are placed is not changed often enough, and the unpleasantness arising from this may get ascribed to the flowers themselves.

It would perhaps not be advisable to sleep in a room in which there was a cartload of the poppies from which opium is obtained, or other similar flowers, but this would be just as inadvisable in the daytime as in the night.

" Flowers are not removed from the wards at night. In small rooms they frequently are, particularly heavily-scented flowers ; not, I think, because of any really harmful effect, but mainly to free the atmosphere from their odour." —Dr. Alfred Russell.

That the Immediate Shooting of a Dog that has Bitten a Person Prevents that Person having Hydrophobia

Only two cases are possible : either the dog has rabies, or he has *not*, at the time of biting the individual ; for the case in which he has only just received the germs of the disease himself we include in the first case. Now if the dog is not suffering from rabies, no amount of biting will produce hydrophobia in the person bitten, though he may object to parting with bits of himself, especially if he be a thin-legged cyclist and the dog selects his calf as the morsel.

Hence, let the dog live (but isolated from other dogs, and under such control as to prevent further outbreaks of playfulness), and thus demonstrate to the remaining portion of the cyclist that the dog was not mad (for if it had only just been inoculated when it bit him, rabies would have developed in from three to six weeks, that being its period of incubation). This will have a most beneficial mental effect upon him, whereas, had the dog been killed the patient would have been for ever left in doubt, and would have been in fear of hydrophobia developing at any time. Again, if the dog does develop rabies, then the medical man in attendance will know how to treat his patient (who in this case must *not* be told of the dog's condition), whereas had the animal been destroyed, he would have been in doubt as to what methods to adopt. Even if the dog be mad, and the bite is through some thick clothing, there is not much to fear, and if hydrophobia does not develop in from three to six weeks, you may be pretty sure you will not have it.

In addition to the above fallacy, we have been told that the right thing to do is to take some of the hair of the dog, directly it has been killed, and dress the wound with it !* *Could* anything be more dangerous than this ? Even if the dog were not mad, his hair is sure to be dirty in comparison with the scrupulous cleanliness that should be observed when dressing all wounds, and thus the patient's blood might be poisoned. On the other hand, if the dog were mad, in addition to the above fact, there would be the further danger of the hair having some of the dog's saliva on it, thus greatly enhancing the chance of infection.

With the explanation just given it must be unnecessary for us to point out that the mere fact of shooting the dog cannot prevent hydrophobia developing in the person bitten.

For a most interesting account of hydrophobia and rabies, and the results of the treatment at the Pasteur Institute in Paris, see *Our Secret Friends and Foes*, by Dr. Percy Frankland. Other accounts, giving full details of the symptoms of hydrophobia or rabies, will be found in Quain's *Dictionary of Medicine*, pp. 696 and 1384. Some more information will be found also under the fallacy that a mad dog *foams* at the mouth, and that he avoids water.

* This treatment is mentioned in the Scandinavian Edda, "Dog's hair heals dog's bite."

Some years ago the author's tom cat bit a servant's upper arm through her dress and she went off to a doctor who cauterised the bite. The doctor explained later to the author's wife that the cauterising was quite unnecessary, as far as the bite *per se* was concerned, but he had to do it to satisfy the girl ! The cauterising made a far more painful wound than the bite.

That you cannot have Measles, Scarlet Fever, and other "Children's Ailments" More than Once

Most diseases are known to be produced by micro-organisms, particular varieties of which have been definitely found to be the causes of typhoid fever, tuberculosis (consumption), diphtheria, cholera, influenza, and many others. Now when any particular variety of micro-organism is causing disease in our bodies, it feeds upon certain substances found there, and also produces a poisonous substance called toxine. Hence if often happens that after a man has had an attack of small-pox he no longer has in his body any of that particular food material that the micro-organism which produces small-pox requires. This result is called acquired immunity from infection, and lasts for years in the case of small-pox. The effect is similar in the cases of typhoid fever, scarlet fever, and measles, though there are numbers of cases in which individuals have had more than one attack of these disorders.

There is another and more generally accepted theory of acquired immunity, known as the leucocytic theory of M. Metchnikoff. Briefly, this is as follows : The leucocytes (of which the white corpuscles of the blood are the most important) are endowed with an individuality, and have the power of enveloping small particles of foreign matter which may get into the blood, and if this matter be of a digestible nature it is assimilated by the leucocytes. Thus these leucocytes act as scavengers of the blood, and this enveloping action has been seen by the aid of the microscope. Hence when disease germs get into the blood they are attacked by these leucocytes ; if the latter win we escape death or a severe attack of the disease, but if the micro-organisms win, then we lose or are lost to this world ! Moreover, if the leucocytes have been once successful in such a contest

with a particular species of bacteria, they will on a future occasion secure the victory over the same species with far greater ease, hence the acquired immunity.

That the Pulling Out of Teeth is a Cure for Any Form of Deafness

" If a diseased tooth has caused any certain form of deafness, its extraction would most probably relieve the deafness, and enable proper treatment to effect a cure, provided the ear has not suffered organic alteration through the tooth ; but the mere haphazard extraction of such tooth to cure deafness, irrespective of its cause, would be irrational and bad practice. To the question, ' Does the extraction of teeth cure deafness ? ' therefore, I, as a general reply, say ' No.' "—Dr. John Cooper Torry, M.R.C.P.

" Deafness is often associated with irritation of the nerves supplying the teeth, and the extraction of the offending tooth will often relieve the deafness, especially when there is inflammation of the root of the tooth."—Dr. Chas. Warden.

" Deafness may result from the exposure of a dental nerve, setting up reflex irritation ; the extraction of the tooth would thus relieve it."—Dr. W. Allen.

Hence we see the above authorities are agreed that it is only *in particular cases* that the extraction of a tooth may be beneficial.

That a Sty on the Eyelid can be Cured by the Lick of a Dog

" Possibly, but the remedy is uncertain and too dangerous."—Dr. J. C. Torry, M.R.C.P.

To this, and to the further question, " Can a sty be cured by rubbing it with a wedding-ring ? " Dr. Warden replied, " A sty is suppuration of a follicle, and probably *any* friction may help to disperse it or, under pressure, break it ; being broken, the lick of a dog might cleanse it, but its saliva might also be injurious, and even poison it."

We have also seen it stated that a sty is certain to go away if struck nine times with a tom-cat's tail. Whether the tail has to be attached to a cat at the time is not said ; if it has, then probably puss would object, and the last state of the eye would be worse than the first.

A sty usually begins in the follicle of an eyelash, and the extraction of the eyelash is one method of treating a sty.

A number of the minor medical fallacies are not worthy of separate treatment, hence we give them *en masse*, and have pleasure in stating that Drs. Allen, Lane, Torry, and Warden affirm that they *are* fallacies. They are as follows :—

That if you buy a wart (saying, " I will give you a penny for that wart ") it goes away.

That you can remove warts by rubbing them with a piece of meat and then *burying the meat.*

That a basin of water put under a bed prevents cramp in the person using the bed.

That sulphur or corks in one's socks or bed prevents cramp.

That a raw potato carried about the person is a preventative against rheumatism.

That blackberries are poisonous in October and not in September.

That eating a mouse is a cure for whooping-cough !

That if you cut your hair at the New Moon it makes it grow strong.

That an onion fastened up over the door prevents illness.

That if the water eggs have been boiled in be applied to the hands it will produce warts on them.

For those who are troubled with warts we may add that they may be removed by means of strong acetic acid or caustic soda, dropped on gently through a small glass tube until the wart is almost saturated with the fluid. Repeat this treatment for two or three days if necessary. Care must be taken to preserve the skin surrounding the wart from being touched with the acid, or it might get burned.

One similar application of fuming nitric acid will also have the desired effect, but great care is necessary with this very strong acid.

That Tetanus (Lockjaw) is Produced by Cutting Some Ligament or Tendon between the Finger and Thumb

It is often supposed that the disease consists only of the forcible closure of the jaws, and that the patient, being unable to take food, dies from inanition. Some consequently think that the treatment is to remove one or two teeth and then administer liquid foods. In reality the clenched jaws is only part of the general condition due to the disease.

" Of immense importance is the identification within the last few years of the specific cause of tetanus, or lockjaw.

Ever since Carle and Rattone proved, in the year 1884, that tetanus was a disease capable of being communicated from one subject to another, inasmuch as rabbits inoculated with the pus taken from the infected part of a man who had died of tetanus also succumbed to the same disease, numerous investigators have been attracted towards this field of inquiry. Nicolaier was the first to discover that certain bacilli, widely distributed in the superficial layers of soil, were capable, when subcutaneously inoculated into mice, guinea-pigs, and rabbits, of setting up symptoms typical of tetanus from which they subsequently died. Kitasato, a Japanese pupil of Dr. Koch, was the first to procure the tetanus bacillus in a pure condition.

" The spores of the tetanus bacillus are very widely distributed, not only in garden soil, but in stables, haylofts, &c., and as they retain their vitality and their virulence for many months, even when dried and kept at the ordinary temperature of the air, or buried in soil, they must be reckoned amongst the most determined and cruel of our microscopic foes."—Dr. Percy Frankland, F.R.S., in *Our Secret Friends and Foes.*

The above is quoted to show that tetanus is due to a specific bacillus and not to the merely mechanical severance of some ligament between the finger and thumb, which is erroneously supposed to be connected with the muscles of the jaw.

As the disease is due to a bacillus, a cut on any exposed part (which is more likely to get inoculated) is liable to produce the complaint, and this bacillus occurring plentifully in soil, a cut on the hand is rather dangerous for those who handle soil much. It may be that as there is no bone near the surface between the finger and thumb to stop a sharp instrument, a cut there may usually be a larger one than in any other part of the hand, and then, being larger, the chances of infection are greater, though Dr. H. Bond says that a cut on any other part of the hand or body is just as liable to produce tetanus if the chances of infection are the same in all cases.

Sir Geo. Newman, M.D., F.R.S.E., D.P.H., at p. 170 of his *Bacteria,* says :—" The popular idea that a severe cut between the thumb and index finger leads to tetanus is without scientific foundation. It is not the locality of the wound nor its size that affects the disease. A cut with a dirty knife,

a gash in the foot from the prong of a gardener's fork, the bite of an insect, or even the prick of a thorn have before now set up tetanus."

" During an inquest on a child at Stepney yesterday, Dr. Morris said that death was due to tetanus, or lockjaw, set up by the use of fuller's earth. The coroner remarked that he held a similar inquest about two months ago. It was a foolish idea that lockjaw could only be caused by a cut between the thumb and first finger. It had been clearly established that it was always associated with dirt in some way or the other."—*Daily Mail*, April 19, 1901.

Anti-tetanic serum, when used early, proved most successful during the European war (1914-18). *All* the wounded were given an injection of this serum as a precaution in case they had been infected by the tetanus bacillus.

That a Frosty Winter is More Healthy than a Mild One

Who has not heard the expression, when the weather at Christmas time has been mild, " This unseasonable weather is most unhealthy " ?

We, ourselves, enjoy a bright, frosty day, and no doubt a dull, damp, foggy, *mild* day could be picked out which would be more harmful to persons suffering from certain diseases ; but we are not considering the weather in relation to any particular disorder, age, or sex, but to the whole community as it is. " Mr. W. H. Dines read a paper on the relationship between the mean quarterly temperature and the death-rate. The Registrar-General's quarterly returns for the whole of England since 1862 were taken by the author, and the number of deaths in each quarter expressed as a departure per 1,000 from that particular quarter's average ; the value so obtained being placed side by side with the corresponding departure of the temperature at Greenwich from its mean value. The rule seems to be that a cold winter is unhealthy, a mild winter healthy, and that a hot summer is always unhealthy, and a cold summer healthy."—*Nature*, April 5, 1894, p. 547.

The complete paper, " On the relation between the mean quarterly temperature and the death-rate," may be seen in the *Quarterly Journal* of the Royal Meteorological Society, vol. XX., p. 173 (1894).

There is some more information in connection with the fallacy, " That a green Christmas makes a fat churchyard."

That Consumption (Phthisis or Tuberculosis) is Not Infectious

As we have pointed out elsewhere, most diseases are now believed to be due to micro-organisms, each disease being produced by a particular micro-organism, and in 1882 Koch published the results of his researches, which proved that consumption is due to the presence of what has now been called the *tubercle bacillus*. This bacillus is found in the sputum of phthisical patients, hence if the sputum be allowed to get dry* it is carried about by wind and other methods. The *tubercle bacillus* has been found in the air of rooms occupied by consumptive patients. If these bacilli be inhaled by a person with consumptive tendencies it is likely to develop phthisis in him, and may even do so in the case of a healthy person. Hence healthy persons should not occupy the same bedrooms as consumptive patients.

Dr. E. S. Reynolds, M.D. (Lond.), says : " It must be considered as practically certain that one case of phthisis has always been ' caught ' from some other case of phthisis, just as with other infectious diseases."

Dr. Alex Hill, M.D., M.R.C.S., Master of Downing College, Cambridge, in his lecture to the Congress of the Sanitary Institute at Birmingham, in September, 1898, said : " Tuberculosis was of slow development, and the infection might not be discovered until months after it took place.

" People talked of consumption being brought on by a chill. To talk of any disease being due to a chill was stuff and nonsense. The chill might direct attention to the disease, or even be the cause of its immediate manifestations, but it never caused it."

Between 1860 and 1890 the mortality from phthisis fell from 2·528 to 1·635 per 1,000, or the decrease was as 3 to 2, *i.e.*, 33 per cent. less.

Judgment was given in 1923 by Mr. Justice MacCardie in favour of a tenant who had rented a furnished house and afterwards found that a man had recently died in it of consumption. The tenant had left and refused to pay the rent and was sued for it by the landlord.

Absurdities in Medicine

" The industrious nosologist Sauvages has calculated that there are about 2,400 disorders to which the human frame is

* The patient should expectorate into a spittoon containing carbolic acid (1 in 20).

liable, and for which it is our sacred duty to investigate every object in nature that can alleviate them. At first, almost everything was indiscriminately received; and then as arbitrarily rejected. Experience has at length enabled us to select from the vast farrago those which really possess the reparative power, and to establish a system which is pretty universally recognised throughout all parts of the globe that have been illuminated by the torch of science. No longer does the talisman, the amulet, work upon a disordered imagination. Charms, witchcraft, and astrology have lost their influence; and although for a time some daring quackery absorbs the public attention, the good sense of the community, aided by the scrutinising vigilance of the medical world, overwhelms it with the contempt it merits. The sponge that wiped the consecrated table of the Pope is no longer superstitiously venerated as a healer of wounds; nor does a throng of unhealthy individuals surround the carriage of our king to obtain the royal touch, once thought to be a specific against scrofula. We no longer find, as in our first pharmacopœias, remedies in human skulls powdered, in parings of the nails, in wolf's liver, in common bed-bugs—all of which, in their appropriate Latin names, obtained the sanction of our learned bodies. The progress of the Materia Medica is now less impeded by superstition, by credulity, ignorance, impudence, false theory, avarice, and a blind obedience to the writings of the ancients. Still, however, much remains to be done, and diligent examination is necessary before we rashly receive into out pharmacopœias substances whose effects upon the tissues of the human body are not thoroughly understood."—Dr. Sigmond.

Sympathetic Powder

Sir Kenelm Digby's "Powder of Sympathy," the celebrated remedy of the middle of the seventeenth century, derived its virtues, not from its composition, but from the mode of its application; for it was not to be applied to the wound, but to the weapon by which the wound was inflicted: the wound was ordered to be merely closed up, and then no further care was taken of it. Most men of sense, indeed, ridiculed the proposal; but after being fully tried, it was found that the sympathetic mode of treating wounds was more successful than those plans which proceeded upon what were considered scientific principles; and it con-

tinued to gain ground in public estimation, until at length some innovator ventured to try the experiment of *closing up the wound without applying the sympathetic powder to the sword.* The result was equally satisfactory.—John Timbs, F.S.A.

That Sunstroke Cannot Occur unless a Person be Subjected to the Direct Rays of the Sun

Fortunately, though many of us may fall into the errors of belief pointed out in this book, such ideas, while distinctly undesirable, are not exactly dangerous. But this is not the case with a considerable proportion, and the fallacy we are dealing with now is a case in point. By thinking that it is only when directly under the action of the sun that this misfortune can occur, we are liable to be careless under other, though equally dangerous conditions.

A reference to Quain's *Dictionary of Medicine* (3rd ed., p. 1641) will soon disabuse one on this point. "Heat-stroke" would more correctly indicate the nature of the trouble. It is due to heat alone, and may occur in any country or climate. Stokers, workers in steel works and glass works, and others employed in hot places are particularly liable to this malady (sunstroke or heat apoplexy). It is not a dry heat which is so dangerous, for if the air is dry it causes a rapid evaporation of the perspiration from the skin, and this action carries away the excess of heat from the body. When a high temperature is accompanied by a moist atmosphere, thus preventing rapid evaporation from the skin, then we have the most trying conditions, especially if there is no wind and many people are congregated. A dry temperature of 100° F. is far less trying than one of 80° F. with a high-percentage humidity.

That a Baker's Trade is Unhealthy, and that consequently the Death-rate is high among Bakers, and that the most Unhealthy Occupations are those connected with Chemical Industries

Dr. John Beddoe, M.D., F.R.S. (Art. "Mortality," Quain's *Dictionary of Medicine*), refers to this fallacy, and points out that the death-rate among bakers is practically the same as it is among solicitors, domestic servants, watchmakers, shoemakers, saddlers, bricklayers and blacksmiths,

all of these being slightly above the average. Medical men and musicians have a high mortality, and the highest of all is among innkeepers and hotel and public-house servants. Dr. Beddoe says :—" The chief causes of a high death-rate in males are evidently alcohol and the irritation of inhaled dust." The lowest death-rate occurs among clergymen.

The National Temperance League publish a small card giving the leading statistics succinctly, and the occasional supplements to the annual reports of the Registrar-General for England give the fullest and most reliable information.

That Town Fogs are not Unhealthy because they contain a lot of " Sulphur " (SO_2)

It is doubtless a good practice in one sense to look on the bright side of things, but it may also be harmful as when this spirit makes us put up with a state of affairs that should *not* be tolerated. *E.g.* until the electrification of the " Inner Circle," the atmosphere in the tunnels of that line was a disgrace to humanity and modern civilisation ; and yet in those days there were Mark Tapleys who told us that that atmosphere was really beneficial on account of the " sulphur " (really sulphur dioxide) it contained.

In a similar manner those people who are wanting in sufficient energy to try to get the smoke nuisance remedied in our large towns, attempt to lessen the efforts of others and to justify their own inaction by saying that the fogs are really good things ! The facts are that a heavy London fog causes a large percentage increase in the London death-rate, as anyone may prove for himself by studying the vital statistics published by the Registrar-General. To take a particular case. There was a particularly bad fog during the first week of November, 1901, and its effects were clearly brought out in the official returns published on November 13, 1901. Three weeks before, the death-rate *in the thirty-three large towns of England and Wales* was 16·7 per thousand, but during the fog week it rose to 19·7 per thousand, an increase of 18 per cent. ; while in London it rose in the same time from 16 to 19·4 per thousand, *i.e.*, an increase of 21·2 per cent.

Fog chiefly affects those whose respiratory organs are weak or diseased, and this fact was only too well brought out by the same fog, for the deaths from diseases of the

lungs increased in the same three weeks from a total of 196 per week to 445 per week, *an increase of 127 per cent.*

New York has overcome the fog nuisance (which it has been estimated by the Hon. Rollo Russell costs London £5,000,000 *per annum !*) by prohibiting the use of bituminous coal. They burn anthracite instead. We could almost entirely remove the deleterious effects of our fogs by the distribution of producer gas for warming and cooking. Another method—and a very simple one—would be for nothing but " coalite " to be burned in London.—*Vide* the author's short paper on the subject read before the Smoke Abatement Congress, in London, December, 1905.

That Diphtheria Attacks only the Throat of the Patient

Dr. James Fletcher, D.P.H., Resident Medical Officer, Ham Green Hospital, Bristol, read a paper on *Postscarlatinal Diphtheria and its Prevention*, at the Sanitary Congress, Bristol, July 9 to 14, 1906. The paper appears in the *Jour. Roy. San. Inst.*, vol. xxvii., No. 8, pp. 382 to 387, and the following is a quotation from it :—

" One cannot help being struck by the frequency with which the nasal cavity has been found harbouring the diphtheria bacillus, at any rate, in Bristol ; and as this has a distinct bearing on what follows, the following statistics are of interest : out of 1,036 cases of diphtheria admitted to the Ham Green Fever Hospital during the years 1901-1905, 246 had the disease in the nose only, and 103 others in the nose as well as the throat."

Thus in 349 cases, or 33·7 per cent., the nose was affected.

That at the Seaside Death always occurs as the Tide goes out

" *'a parted even just between twelve and one, e'en at turning o' the tide.*—" King Henry V., Act 2, Sc. 3, l. 12.

Charles Dickens encouraged this fallacy in *David Copperfield*, wherein he wrote, " I was on the point of asking him if he knew me, when he tried to stretch out his arm, and said to me, distinctly, with a pleasant smile, ' Barkis is willin.' And, it being low water, he went out with the tide." Probably in this instance the popular fancy has seized upon a false analogy, by which the life of the patient and the tide are both supposed to ebb at the same time. Having formed an opinion, or formulated a theory, the popular (but un-

scientific and unsatisfactory) method is to try to find facts which fit the theory, while those which do not so fit receive scant notice. Hence, deaths which occur as the tide goes out would be noted and remarked upon, while others would be passed unnoticed.

That it is an old idea is proved by the fact that Sir Thomas Browne refers to it in *The Letter to a Friend*, and therein refers to a passage in Pliny which is given in a footnote as, "Aristoteles nullum animal nisi æstu recedente expirare affirmat; observatum id multum in Gallico Oceano et duntaxat in homine compertum. *Lib. 2, cap. 101.*"

That Whooping Cough Leaves only in the Month of May following the Attack

Whooping cough is more common in the early Spring in this country, and frequently disappears with the advent of Summer, *i.e.*, about May. This probably explains the popular notion, but there is no reason why this should be so, except in order to give the case time to run its course.

That People with Florid Complexions are Particularly Healthy

The cause of the colour must be investigated by a medical man before he can form an opinion as to its indications; but high colour may be associated with grave physical disease, and Dr. Gustav Jaeger, in *Health Culture*, says:—"... the current conception of florid exuberant health is altogether erroneous."

That it is Desirable for Children to be Fat, as they are then more likely to be Healthy

There is healthy and unhealthy fat. Many rickety children are abnormally fat as the result of taking injudicious foods, such as many of the much advertised starchy preparations. Fat children are often backward in walking, probably on account of their muscles not being properly developed. *The Lancet* dealt with the question as long ago as 1872, and said that fat children are less able to resist disease. Dr. E. Smith also supports this view in his work on *Foods*, and ends by saying:—"... the more fattening infants' foods are, the less likely are they to make muscular men and women."

That a Medical Man may Legally Smother a Hydrophobic Patient

"M.A., Balliol," gives this as one of many instances of Somersetshire folk-lore in vol. ix., p. 536, of *Notes and Queries*, and the author well remembers his mother telling him of the alleged right of a doctor in such a case. It has been suggested that this fallacy has arisen through a hydrophobic patient being regarded as "possessed of devils," and that therefore he might be killed in the same manner as, in the "good old times," witches were allowed by law to be put to death.

"There is, or was, an opinion that patients suffering from the complaint are smothered by the attendants. I should think such an idea could now only exist amongst the unreflecting, not to say ignorant; yet it appears that a practice almost amounting to this was actually recommended and adopted by Van Helmont. 'He kept his patients under water * until the psalm "Miserere" (51st containing 19 verses) was sung; and in one case a poor girl was drowned.'"—J. B. Harrison in *Chamb. Edin. Jour.*, 1849, p. 103.

"It may seem, too, incredible to us that less than a century ago the suffocation of the wretched victim [of hydrophobia] was not unfrequently resorted to, and instances of this barbarous practice may be found in the periodical literature of bygone years. Thus in *The Dublin Chronicle* (October 28, 1798), the following circumstances are recorded: 'A fine boy, aged fourteen, was bitten by a lady's lap-dog near Dublin. In about two hours the youth was seized with convulsive fits, and shortly after with hydrophobia†; and, notwithstanding every assistance, his friends were obliged to smother him between two feather beds.' . . . As recently as the year 1867 this mode of death was put into execution in the town of Greenfield, Michigan. A little girl having been seized with hydrophobia, a consultation was held by the physicians, and as soon as it had been decided by them that she could not recover, her parents put an end to her sufferings by smothering her to death."—Rev. T. F. Thiselton Dyer, M.A., *Domestic Folk-lore* (1881), p. 156.

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* Elliotson in *History of Medicine*, Vol. II., p. 726.

† "The incubation period of hydrophobia in man is usually six weeks; it has been asserted that it may be as short as three weeks." Quain's *Dictionary of Medicine*, p. 696.

A full report of a coroner's inquest on a death from hydrophobia appeared in the *Daily Mail* of Mar. 28, 1910, and in the course of his remarks the Coroner, Dr. Wynn Westcott, said, " In olden times it is said that they used to put them under a feather bed and smother them, but nowadays a doctor must not do anything wilfully to injure anyone."

That Articles of Clothing may be Satisfactorily Disinfected by Exposure to Dry Heat

" The prevalent idea of disinfecting articles of clothing by an exposure to dry heat in an oven is most mischievous and unsound, because, without the risk of injuring the materials or fabrics, no greater heat than 220° F. can be employed, and this temperature, unless maintained for something like eight to ten hours, is incapable of destroying infection. Hot air moistened with steam is somewhat better than hot dry air, but much inferior in both penetrating and germ-killing power to steam, either super-heated or saturated."—Drs. Notter and Firth in *Hygiene*, p. 294.

That, as a rule, People when just about to Die Suffer Agony

" Darest thou die ?
The sense of death is most in apprehension ;
And the poor beetle, that we tread upon,
In corporal suffrance finds a pang as great
As when a giant dies."

Measure for Measure, III., i., 79.

" That we the pain of death would hourly die,
Rather than die at once ! taught me to shift
Into a mad-man's rags ;"

King Lear, V., iii., 185.

In the *Book of Days*, by R. Chambers, Vol. I., p. 377, are given the last words of some remarkable persons which certainly do not support the idea of there being great pain during the last few minutes. This quotation is from the *Quarterly Review*, " The pain of dying must be distinguished from the pain of the previous disease ; for when life ebbs, sensibility declines. As death is the final extinction of corporeal feelings, so numbness increases as death comes on. The prostration of disease, like healthful fatigue, engenders a growing stupor—a sensation of subsiding softly into a coveted repose."

The following appeared in the *Daily Mail* of Jan. 16, 1907 :—

" Sir,—Within the last few days I have twice read in the newspapers the expression ' the last scene of the death agony,' one in connection with the death of the Baroness Burdett-Coutts and the other with the Shah.

" I am much afraid that this conveys to the mind of the layman that we must all (or the majority of us) pass through this state, whereas few of us will. Except in rare cases, the ' agony ' of death is a myth.

" The senses are mercifully darkened as the pall of death is drawn over the traveller about to pass into the undiscovered country, and he drifts on ' through slumber to a dream, and through a dream to death.' This may comfort some of your readers.

" Clarence I. Ellis, M.D., etc.

" Newcomen Lodge, Dartmouth, S. Devon."

In Feb., 1914, there was a correspondence in *The Times* on the subject in which many persons, who had for all practical purposes " died," took part, and nearly all of them agreed that dying was painless or very nearly so. Mr. A. C. Benson (son of Archbishop Benson), President of Magdalene College, Cambridge, gives his confirmatory testimony in *The Face of Death*, one of a collection of pieces entitled *Along the Road*. Mr. A. C. Benson has also called attention to the particularly peaceful death of his father in Hawarden Church.

Bacon in his *Essay on Death* (which, however, Mr. J. M. Robertson says is *not* by Bacon, but probably by Sir Thomas Browne, M.D.), says, " You should read in some of the friars' books of mortification, that a man should think with himself what the pain is if he have but his finger's end pressed or tortured, and thereby imagine what the pains of death are, when the whole body is corrupted and dissolved: when many times death passeth with less pain than the torture of a limb; for the most vital parts are not the quickest of sense. . . . It is as natural to die as to be born; and to a little infant, perhaps, the one is as painful as the other."

Browne's words in Sec. XLIV. of his *Religio Medici* are, " . . . and sure there is no torture to the rack of a disease, not any poniards in death itself, like those in the way or prologue unto it."

" This fear is ill-founded. The last moments of life are more distressing to witness than to endure. What is termed ' the agony of death ' concerns the watcher by the

bedside rather than the being who is the subject of pity. A last illness may be long, wearisome and painful, but the closing moments of it are, as a rule, free from suffering. There may appear to be a terrible struggle at the end, but of this struggle the subject is unconscious. It is the onlooker who bears the misery of it. To the subject there is merely a moment—

'When something like a white wave of the sea
Breaks o'er the brain and buries us in sleep.'"

Sir Frederick Treves, Bart., F.R.C.S., p. 176, *The Elephant Man, and other Reminiscences* (1923).

The author's wife, in her former career as a hospital nurse, saw literally hundreds of persons die, but she says that none of these cases suffered any death agony, even though, in many cases, they may have suffered painful illnesses.

That a Boil "Cleans Out" the Blood of the Person who has it, and Tones up his System, and that it is possible to take Cold in a Boil

Boils, like most diseases, are caused by bacteria, this time by one named *Staphylococcus pyogenes aureus*, who has a nasty little habit of getting into the sebaceous glands of the hair-follicles. The entrance is often caused by the skin getting chafed, as by a collar. Not only do boils not "tone up" the system, but, if they are large or numerous, they may cause extreme debility. Dr. L. K. Hirshberg, in dealing with a number of popular medical fallacies in *The American Magazine* (p. 655) for Oct., 1906, says, "The notion that boils purify the blood and 'tone up' the system is but one of 10,000 popular medical fallacies. . . . The popular idea that it is possible to take cold in a boil, and that the result is dangerous, is utterly and hopelessly nonsensical. By a cold in a wound a layman means an infection. A boil is already infected, else it wouldn't be a boil. Hence it is absurd to believe that it may be infected again."

"People say that boils are healthy, or that gout is healthy; but in these speeches, if they have any meaning at all, there is an elliptical idea. We might say that bleeding was salutary, or rhubarb and magnesia salutary, but then we should presume that there was a state of disease to be corrected. Now allowing a certain amount of disorder to be actually *present*, an attack of gout *may* be favourable, *not* because

it is good in *itself*, but because, mischief being actually present, the gout is the means of eliminating the *materies morbi*. In this view of the subject, indeed, many of our diseases might be called healthy. However, we frequently find people congratulating themselves on the gout; or a friend will tell you, if you show him a painful boil, 'That you may thank your stars, inasmuch as it is an indication of full health.' In my own view, neither the gout nor the presence of boils is any proof of good health, but rather a proof of the contrary."—J. B. Harrison, Surgeon, in *Chamb. Edin. Journ.*, 1849, p. 124.

That a Linseed Poultice is especially Valuable on account of the Linseed of which it is made

Poultices have been popular in the treatment of certain disorders for many a long year, and these poultices have been made of a number of different substances, such as bran, bread, and linseed. The latter substance is somewhat more convenient than the others, because it holds together better. The virtue of a poultice, however, does not lie in the material of which it is made, excepting the hot water. It is the heat of the hot water which does the good, and the bran, bread, or linseed meal merely acts as a sponge. The specific heat of water is greater than that of any other substance (except hydrogen), and hence we should aim at utilising as much water as is practicable in the formation of a poultice. This is now being done by means of fomentations instead of poultices. A fomentation is formed of lint, flannel, or sponge, soaked in water as hot as can be borne by the patient.

That Malaria is Caused by Bad Air

"All the infections that the sun sucks up
From bogs, fens, flats, on Prosper fall, and make him
By inch-meal a disease"

The Tempest, II., ii., 1-3.

Malaria is an Italian word meaning "bad air" which was formerly thought to be the cause of the disease. The name doubtless perpetuates the mistake. There was every excuse for the error as it was noticed that those who were much exposed to night air in certain districts were very liable to contract the disease. The reason for this is that the mos-

quitoes, which play so important a part in connection with this disease, feed chiefly at night time.

Nott made a shot at the explanation of the transference of the disease as long ago as 1848. In 1880, Dr. Laveran, a French army surgeon, discovered that malaria was caused by bacteria of a crescent-like form, and agreed with Nott that infection was possibly conveyed from man to man by mosquitoes.

In 1894, Manson also suggested that the means of transference was the mosquito, and since 1898, it has been established, without a doubt, by Sir Ronald Ross, of the Indian Medical Service, and the British School of Tropical Medicine, that malaria is caused by the micro-organisms injected into the blood by the bite of the *anopheles* mosquito or gnat.

One of the tests to which the "mosquito theory" was subjected was described by Mr. Stephen Paget, F.R.C.S., in a lecture to the Hospital Officers' Assoc., delivered in St. Bartholomew's Hosp., on Dec. 17, 1909. It consisted of allowing certain mosquitoes to bite some malaria patients in Rome. These mosquitoes were then sent to London (to the British School of Tropical Medicine) together with some other mosquitoes which had never fed on malaria patients. The two groups of mosquitoes were then allowed free meals by feeding on two groups of healthy persons. The persons bitten by the mosquitoes which had previously bitten (in Rome) malaria patients developed malaria, but those bitten by the other group of mosquitoes were not affected. It is the female mosquito which transmits the disease from man to man. (According to very early history this is not the first time a female has caused man some trouble!)

The *anopheles* mosquitoes breed freely in marshy ground where there are puddles of water, and Sir Ronald Ross found that the conditions of health could be greatly improved by having all the puddles filled up with earth, or by pouring paraffin oil on the surface of the water as a temporary remedy. The use of mosquito nets round beds, and fine wire-gauze in windows and doors, also reduces the chances of infection by malaria.

Vide long review by W. G. King, of *Memoirs : With a full account of the Great Malaria Problem and its Solution*, by Sir Ronald Ross, in *Nature*, July 7, 1923, p. 3.

Discovery, Sir Richard Gregory, p. 226.

That people can catch cold in bed

That noble heroine and mother of modern hospital-trained nurses—Florence Nightingale—dealt with this mistake in her *Notes on Nursing* (1860), where, at p. 9, she said : " With a proper supply of windows, and a proper supply of fuel in open-fire places, fresh air is comparatively easy to secure when your patient or patients are in bed. Never be afraid of open windows, then. People don't catch cold in bed. This is a popular fallacy. . . .

" I know an intelligent humane house-surgeon who makes a practice of keeping the ward windows open."

The last sentence shows how much before her time and the medical profession she was in this matter (and others, too !), which is now standard practice with the faculty.

Sir John A. Cockburn, M.D., in his inaugural address at the congress of the Royal Sanitary Institute at Brighton on Sept. 5, 1910, said that the ventilation of railway carriages, especially of Pullman cars, needed improvement.

" There are smoking carriages for those who affect the weed, why not fresh air carriages also in which any occupant could demand that one at least of the windows should be kept open ? The objectors generally express the fear of catching cold. It is high time that this fallacy were exploded. What is called a cold in the head is an infectious disease, and is caught nowhere so readily as in close compartments. Fresh air, far from being the cause, is the best preventive."

That heredity is a kind of Fate from which we cannot escape

Dr. W. B. Drummond, in *An Introduction to Child-Study* (p. 62), says :—" There is a curious popular idea that heredity is a kind of Fate in whose meshes we are entangled at birth, and from which, struggle as we may, we cannot escape. Some people actually write of ' the dreadful doctrine of heredity.' They seem to think that heredity is a kind of bogie invented by scientific men in order to frighten poor humanity. Such people seem to have got hold of the notion that heredity means that, if our father has died of cancer, we shall inevitably fall a victim to the same disease ; or that, if a man is a drunkard and a rogue, it is worse than mockery to teach his children to pray for grace to live a godly, righteous and sober life. . . . A child may be born with the gift of song ; he may have it

in him to become an artist, a musician, a statesman. But the circumstances of life may draw him at an early age into some arduous business which engrosses his entire attention and absorbs his entire energy. The result is, his talent dies. Again, a child is born of a consumptive parent; he inherits something of that parent's constitution. But must he inevitably die of consumption? By no means. It is true that, if he is badly nourished in childhood and apprenticed to an unhealthy trade, the danger of his doing so is inevitably great. But attend carefully to his bodily health in youth, and bring him up to lead a healthy outdoor life, and the probability is that he will live to a green old age."

Sir Francis Galton, F.R.S., in the introduction to the second edition of his *Life History Album* (which every parent should keep for each of his children), p. 3, says: "I experimented frequently in guessing at the cause of death of a deceased individual from the knowledge of those of his ancestry, and I found my guesses to be on the whole grossly incorrect. But though the stated cause of death could not be predicted with any approach to a useful degree of accuracy, the inheritance of minor ailments was conspicuously manifest."

That it is more dangerous to prick oneself with a pin than with a needle

Two of our medical referees replied: "No, the effect depends on the contamination conveyed by the needle equally with the pin." This is equivalent to saying that the metals of which pins and needles are made are not *per se* poisonous, and thus the fallacy is practically the same as the following one concerning the nails or claws of animals.

That the Nails of Animals *per se* are Poisonous

The idea that persons retain poison in their nails is traced by Sir Henry Halford, in *Poisons of the Ancients*, to the following statement as to the cause of the death of Alexander the Great. Alexander is said to have been poisoned, and the report is that the poison was sent by Antiphon, and was of such a peculiar nature that no silver or metallic vessel would contain it, and that therefore it was conveyed in the hoof of a mule. But the vessel was really of onyx, as Horace says:—"*Nardi parvus onyx.*" Now the word "onyx" (Greek) signifies not only a stone, but unguis, a hoof or nail;

and the second sense had evidently been given instead of that of the precious stone. This double meaning of the term onyx Sir Henry Halford considers to explain the error concerning poison being retained by persons in their nails.

Dr. John Torry, M.R.C.P., replied :—

" No ; not *per se* absolutely ; but a wound so caused may be fatal, from the claw-nail being charged with poisonous matter. It might so cause rabies, pyæmia, &c. Under the cleanest condition of a nail, a wound by it would not be a simple incision like the smooth cut of a sharp instrument, which generally heals by what is technically termed the ' first intention ' ; it would be a rough, jagged wound, termed ' laceration,' slow to close, liable to the formation of purulent matter, and therefrom to blood-poisoning with its many complications."

Dr. Charles Warden replied : " Germs exist everywhere, especially where there is dirt, and very likely so exist about the nails, and therefore it is almost impossible to keep them aseptic ; but a perfectly (chemically) clean nail should be harmless."

We believe Lord Lister, Past P.R.S., made the experiment of washing hands in various antiseptics and disinfectants, sometimes in a series of them, and then scraping a very small quantity of matter from under the nail (not the nail itself), and putting it into a cultivation medium, and in all cases bacterial life showed itself.

That when you Burn Yourself the Part should be held before a Fire to " Draw out the Inflammation "

" And falsehood falsehood cures ; as fire cools fire
Within the scorched veins of one new burned."
King John, III., i., 277.

" As fire drives out fire, so pity pity."
Julius Cæsar, III., i., 171.

" One fire drives out one fire ; one nail, one nail ; "
Coriolanus, IV., vii., 54

" Even as one heat another heat expels,
Or as one nail by strength drives out another,"
Two Gentlemen of Verona, II., iv., 190.

The practice indicated may be the homœopathic treatment, but it is not recommended. In treating a burn the chief aim is to prevent the air getting to the injured surface ; and for this purpose smear carron oil (a thorough mixture of

equal parts of lime water and linseed oil), boracic ointment, vaseline, or salad oil over the burnt part quickly and carefully, and then wrap in cotton wool or lint.

At p. 354 of Pye Chavasse's *Advice to a Mother*, 16th ed., edited by T. D. Lister, M.D., we read, "Do not hold the hand, if that be the part affected, to the fire with the idea of *drawing out the burn*. Such a proceeding is acutely painful, and utterly useless. It is one of those foolish superstitions and traditions that form even in these enlightened days some of the chief dangers to infancy and childhood as well as to older people."

That it is Good to Use Cobweb to Stop a Cut from Bleeding

"I should desire you of more acquaintance, good Master Cobweb: if I cut my finger, I should make bold with you."
A Midsummer Night's Dream, III., i., 175.

The practice is condemned in *First Aid to the Injured*, the official handbook of the St. John Ambulance Assoc.

You may thus stop the bleeding, but the last state of that man who was losing blood will probably be worse than the first, for you could scarcely get anything more likely to cause blood-poisoning or disease than the dirt (containing disease germs) with which all cobwebs are infested. Here is a case mentioned by Dr. Percy Frankland, F.R.S., in *Our Secret Friends and Foes*. "As a small child happened to cut its finger with an ordinary kitchen knife, its father endeavoured to stop the bleeding of the wound by binding it up with some cobwebs, a superstitious practice which would be more honoured in the breach than the observance, for the child developed nearly a month later typical symptoms of tetanus (lock-jaw).

"It was proved beyond doubt that the spider's web was responsible for the mischief; for rabbits and guinea pigs, inoculated with some web from the same place, died under particularly well-defined symptoms of tetanus. Doubtless the spores had been caught in the web, conveyed thither by some chance current of air, and had remained contentedly attached until the opportunity came to them for exercising their disastrous powers."

An account of a woman, who appeared as complainant in a Tiverton assault case, with a large cobweb on her head as a bandage, was given in the *Daily Chronicle* of May 31, 1906.

If it be an ordinary cut in which no artery or vein is injured, the bleeding is technically known as "oozing," and to stop this use ice or ice-cold water. If this fail, then try hot water (it is no use merely warm, and must certainly not be too hot either; about 120° F. will be found satisfactory), so as to coagulate the blood. Or a solution of ferric chloride or of alum may be used. Dress with clean water, to which a few drops of carbolic acid or a little permanganate of potassium or permanganate of sodium have been added.

Do not give brandy; it only excites the heart, and causes it to pump the blood out all the faster, and do not dress the wound with wine and salt or tobacco.

Anyone wishing to know exactly what to do in emergencies of this kind, should attend a course of lectures on "First Aid to the Injured," given under the auspices of the St. John Ambulance Association, whose headquarters are at St. John's Gate, Clerkenwell, London, E.C. Chapter IX. (Emergencies) of Dr. Reynolds' little book, *Hygiene*, contains some most valuable information.

That Scarlet Fever and Scarlatina are Different Diseases

This is one of the dangerous fallacies; that is to say, acting on this belief people may do themselves or others much harm. They are absolutely the same disease; but if the case happens to be a mild one, many people most erroneously think it is not so contagious or even contagious at all, call it scarlatina, and then excuse themselves from taking the necessary precautions.

This fallacy is dealt with by Dr. E. S. Reynolds, M.D. (Lond.), at p. 200 of his *Hygiene for Beginners*, and was also dealt with by J. B. Harrison, Surgeon, in *Chamb. Jour.*, 1849, p.122.

Vide the next fallacy.

That a Mild Case of an Infectious Disease is Capable of Transmitting only a Mild Case to Another Person

This is a most dangerous fallacy. As well might we say that because a certain wheat-field was thinly sown with wheat, therefore the wheat gathered from it could not be so sown as to produce a close-set and fine crop of wheat.

The mildness of an attack of any disease depends almost

entirely upon the state of our system at the time we become infected, and there is little doubt that we often become infected with the germs of some disease or another, and yet do not develop that disease because our systems are strong enough at the time to overcome the infection. Sometimes this may occur without our being conscious of any effect; at others we may feel "a bit seedy" while the struggle between the disease germs and the white corpuscles of our blood is going on. In the other case, when we really develop the disease, the harmful germs gain the upper hand, and if this lasts, we die; but if after some time the white corpuscles win, then we recover.

Hence we see that an amount of infection which at one time may cause us to develop the disease, at another, may prove comparatively harmless to us. If we are in fairly good health when we become infected, then probably it will be a mild case; but if the system is very low at that time, then it will probably be a severe or even fatal case; hence the necessity of always paying attention to matters of health, and thus keeping the body in good condition.

That in Restoring the Apparently Drowned, or Suffocated, the Body should be Rubbed with Whisky

Here we have yet another example of a positively dangerous fallacy (an example that a little *ignorance* is a dangerous thing).

Another fallacy in connection with the restoration of the apparently drowned, is to place the body on a cask or similarly shaped articles.

With regard to the irrationale of the whisky practice, it is most important to get the body dry and warm, but we all know how cold our hands feel if we pour either spirits of wine, or any other volatile fluid upon them. This is due to the rapid evaporation, and whisky has a similar, though less marked, effect. Hence it certainly would not warm the body, any more than sprinkling pepper on it would. The idea has probably arisen through confusing the effect of an irritant with the effect of heat. For complete instructions how to act in the case of a person apparently drowned, see the publications of the Royal Humane Society of 4, Trafalgar Square, London, W.C.

That it is Better for us to have the so-called "Children's Ailments" (Measles, Whooping-cough, Chicken-pox, Scarlet Fever, &c.) when we are Children than for us not to have them at all in life

It is a most common thing to hear a mother make some such statement as the above, and as she believes it to be true, she takes little or no precaution to prevent her children going where they are likely to become infected with these maladies. Personally, the author is very grateful to his parents for the care they took in the matter, as the result of which he was doubtless saved from all but the first-mentioned complaint in the above list, and that until he was 17 years old, and therefore less likely to be harmed by it.

Dr. J. Cooper Torry, M.R.C.P., wrote: "Better not have the diseases at all"; and Dr. Charles Warden: "Certainly not; these disorders are great evils, but not necessary evils."

Dr. George Reid, D.P.H., goes into this question carefully in his *Practical Sanitation* (3rd ed., 1895), pp. 190-192, to which we refer the reader for full particulars, though we give his most important conclusions below:—

"The common practice of exposing children to infection, on the pretext that the ailment, whatever it may be, is mild in its nature, and that, sooner or later, they will contract the disease in any case, is greatly to be condemned. One especially hears this argument used during outbreaks of measles, whooping-cough, and scarlatina. It is, however, highly fallacious, for the following reasons:—

(1) A mild case may give rise to a serious one.

(2) It by no means follows that all should suffer during some period of their existence.

(3) One attack does not necessarily afford protection from a second.

(4) The fatality in children is nearly always greater than in adults.

(5) The liability to attack diminishes with age.

"Sixty per cent. of the deaths from measles occur during the first two years of life, 75 per cent. during the first three, and over 90 per cent. occur among children under five years; while of the fatal cases of whooping-cough, 40 per cent. occur under one year, 75 per cent. under two years, and 96 per cent. under five years.

"Enough has been said to show the risks that children run through careless exposure to infection, and the facts cannot be too forcibly brought home to those whose duty it is to protect them.

"Sometimes one does meet with thoughtful and intelligent parents."

The medical correspondent of the *Daily Mail*, writing in that paper on February 15th, 1911, in reference to the epidemic of measles then prevailing, stated: "One of the commonest mistakes is to consider it a very mild ailment. I have heard a mother say when her eight-year-old child brought the disease home from school, 'Now we have got it in the house the younger children may as well have it too, and be done with it.' Nothing could be a greater mistake . . . . Measles is the third most fatal fever among children. It may be spread by a patient before the rash appears. The dangerous time is not during the disease itself but during convalescence."

School Hygiene for January, 1912, gave some interesting particulars of the results of a comparison recently instituted by the Medical Officer of the great Manchester Grammar School of the physical stamina of his hundreds of charges during the last five years with that of their predecessors of 1881–6. There has been a remarkable gain in nearly all directions, especially as regards height and weight, amounting to more than 1 in. in height between the ages of 13 and 16, and to an average increase of more than 4-lb. in weight. At the age of 16 the boys are 1½ in. taller and 8 lb. heavier than a generation ago. These calculations are based on more than 6,000 measurements. The chief reasons for this change are ascribed to the steady diminution or postponement of early infections disease in childhood, and the increased attention given to athletics and physical exercise.

Two celebrated cases of the evil effects of children's ailments may be mentioned:—

Laura Bridgman (a blind deaf mute) was partially deprived of the senses of taste and smell by an attack of scarlet fever when she was 3 years old, and Helen Keller, also a blind deaf mute, was deprived of her senses of sight, smell and hearing, by an attack of scarlet fever when she was only 2 years old.

At p. 174, *Eugenics* (1912), Edgar Schuster, M.A., D.Sc., tells us that Tredgold, in considering the causes of feeble-

mindedness, epilepsy, and paralysis, " attaches most weight to the action of acute infectious diseases occurring in infancy."

While in an article on Scientific Research and Preventive Medicine at p. 347, *Nature*, January 2, 1919, it is said, " Who has heard of extensive research work on measles, scarlet fever, or whooping-cough in recent years; yet who doubts that these diseases may leave many and serious after-effects which often need very prolonged treatment in after-life, and incontestably produce extensive disablement ? "

" Some diseases also, by their weakening action upon the body, render the tissues more liable to invasion by other organisms, and it is for this reason that Measles and Whooping-cough, Pneumonia and Influenza, are so often followed by broncho-pneumonia, or by tuberculosis, these diseases preparing the way, and rendering more easy the entrance and multiplication of strepto—and pneumococci or of the tubercle bacillus."—W. E. C. Dickson, M.D., B.Sc., *Bacteriology*, p. 44.

" It appears that the constitution of youth is not so elastic as we are apt to think, but that an attack, say of scarlet fever, leaves a permanent mark, easily to be measured by the present method of comparison. . . . my friend had also registered the various infantile illnesses of the children, and corresponding to each illness was one of these halts. There remained no doubt in my mind that, if these illnesses had been warded off, the development of the children would have been increased by almost the precise amount lost in these halts. In other words, the disease had drawn large upon the capital, and not only on the income, of their constitutions."—Sir Francis Galton, pp. 168-9, *Inquiries into Human Faculty*.

Quain's *Dictionary of Medicine* (1902), p. 1874, says of Whooping-cough, " Those who escape infection in childhood generally escape it altogether. When the disease affects adults it runs its full course with the same symptoms, and the same instinctive dread of recurrent spasm, as in infancy, but without any practical risk of complications."

Quain also says (p. 1876), " Great risks, without corresponding benefit, have been run by taking children to gas-works during the course of the complaint."

The quotation from Quain refutes another fallacy, for it is often stated that if an *adult* has whooping-cough it is a very serious matter.

That certain Invalids can be Laughed out of their Complaint

"Few ideas are more erroneous. Thus to ridicule the complaints of the hypochondriac is very inconsiderate, for, as the physician is often obliged to humour the patient, and to prescribe what is termed a *placebo* (Latin *placere*, to please), so relatives and others should, when the patient appears, from increased irritation, to require soothing, listen to a string of complaints which they know to be in a great measure exaggerated rather than by totally disregarding and ridiculing them, add to the irritation of the mind of the individual, who, notwithstanding his fancies, is actually in a state of disease."—J. Timbs, *Popular Errors*.

Cheerful companions, and hearty laughter which is most infective, are often the best of medicines, but they cannot be administered entirely against the patient's will.

Hood was naturally of a sad disposition, but finding that men preferred to laugh rather than cry, he had, as he said, to be a lively Hood in order to earn a livelihood!

That anyone Imbibing Typhoid Bacilli must necessarily Contract Typhoid Fever

In Fergusson *v.* the Malvern Urban District Council, heard in the King's Bench Court before Mr. Justice Lawrence and a special jury in Jan., 1908, Dr. Thresh, the chemist and bacteriologist, said he had swallowed millions of typhoid bacilli. The judge asked him how he liked them and Dr. Thresh replied:—

"Well, for three weeks I enjoyed the pleasures of imagination, and when the three weeks had passed and nothing had happened I felt happy. The thing occurred accidentally. I was testing water which was said to contain typhoid bacilli. The weather was hot, and I swallowed a glass of water and then discovered I had drunk the water in which I had put the typhoid germs."—*Daily Mail*, Jan. 25, 1908.

It is not often one can refer to so definite a case, but it is generally recognised that we frequently receive the bacilli of various diseases into our systems without the corresponding diseases developing. The human system when in good condition is capable of successfully dealing with a certain amount of infection, this useful effect being obtained by the white corpuscules of the blood which act as scavengers.

That Goitre is caused by Drinking Melted Snow and Ice

This idea has probably arisen from the fact that the complaint is extremely common in cold, moist valleys of the Alps, Andes, Himalayas, and other similar regions, as in South Anerica, but it is also so common in Derbyshire (where there is no snow-water) that it is called " Derbyshire neck." It does not occur to any abnormal extent in the United States where enormous quantities of melted ice are consumed.*

The etiology of goitre is not completely understood, but it is associated with the presence of magnesian limestone in the soil and drinking water.

Dr. G. R. Murray, F.R.C.P., and Mr. W. Pugin Thornton, in Quain's *Dictionary of Medicine*, say, " Snow-water was formerly considered to be the cause, but this opinion is met by the statement that goitre does not exist in Greenland or Lapland, and that it is prevalent in Sumatra where there is never any snow." These two authorities also agree that the cause is some impurity in the drinking-water, which fortunately can be rendered harmless by boiling.

Dr. Andrew Wilson states that the disease most frequently occurs in places in which the drinking water is of an extremely hard character.

The fact that boiling renders the water innocuous is consistent with both the microbic theory and the " hardness " theory, for boiling kills bacterial life; it also softens, or partially softens, hard water.

That Night-air is Unwholesome

" And will he steal out of his wholesome bed,
To dare the vile contagion of the night
And tempt the rheumy and unpurged air
To add unto his sickness ? "
Julius Cæsar, II., i., 263.

" The poisonous damp of night disponge upon me."
Antony and Cleopatra, IV., ix., 13.

This subject was fully dealt with by Dr. C. W. Saleeby, M.D., F.R.S.E., in the *Pall Mall Gazette* of Apr. 30, 1907, of which the following is an abridgment :—

* This water in England is usually called " iced-water," but Americans correctly call it " ice-water," for it is in fact melted ice, and *not* water into which lumps of ice have been placed.

"THE NIGHT-AIR SUPERSTITION.

"Preparing to meet the published request of a correspondent for an article on domestic myths, I find that the night-air superstition, which he names, demands an article to itself, and the others must wait. We all spend about one-third of the physical life—which is a serious concern of the psychical life—in our bedrooms, no matter what our waking occupations may be. The subject, therefore, proclaims its own importance. Let us begin with a little history, begging, for the moment, the question whether or not the night-air theory is a superstition. The common belief is due, I believe, to the indisputable fact that in many parts of the world, including those from which our civilisation is derived, exposure to something in the night-air is exceedingly apt to produce the serious and often deadly disease known as malaria, one of the diseases that have helped to make history, since, as Prof. Ronald Ross has shown, it was probably the determining factor in the fall of Greece—which had no quinine.

". . . Briefly, then, the night-air superstition owes its origin to the fact that the female mosquito feeds at night. The male has no lower jaw, and may be ignored. The mosquito breeds in the marshes, and that is all their connection with the business. It is not the night-air, but the pestilence that *flieth* by night—if I may misquote—which breeds the disease. . . .

"What are the specific differences between night-air and day-air in this country? So far as gaseous composition is concerned there are no substantial differences, except that in cities night air may contain less carbonic acid, since less fires are burning. Point 1 is therefore in the favour of night-air. Also, perhaps, night-air may contain fewer organic gases, since, in the absence of the sun's heat, putrefactive processes are less active. Certainly night-air contains no kinds of miasm peculiar to itself—except those produced in the bedroom. As to solid matter, night-air, again, has the advantage for the city dweller, since less traffic means less dust—less microbe-laden dust. I do not here reckon with the imbecilities practised in some cities, where huge circular brushes sweep the roads at night, without previous watering. Only in a civilisation where all possible imbecilities are practised could this pass unnoticed. Night-air differs,

again, in that it is colder, as a rule, and undoubtedly if you propose to ventilate your bedroom you may require an extra blanket. The advantage of breathing pure instead of foul air during one-third of your whole existence is perhaps not too dearly bought thus.

"Now let us turn to the bedroom and consider its case. You cannot hermetically seal a bedroom, even with doors and windows shut. No one, I suppose, would be so foolish as to close his chimney: the night-air will in any case come in. And this is very well, for there is no bedroom in any palace or hovel in this country that contains an adequate amount of air for one sleeper during the whole night. It does not matter that the bedroom is big, except in so far as that makes ventilation easier. We must avoid the popular and legal fallacy of identifying cubic feet of space with cubic feet of air. You will never have enough cubic feet of space in a bedroom to prevent the necessity of replenishing the air they contain. The factory laws do not recognise this, but demand merely cubic feet of space, and the recent Royal Commission found the air abominably foul in many cases where the legal requirement was complied with. The most foolish of us is fortunate, then, since he cannot quite avert all ventilation from his bedroom, even though this involves the necessity of his breathing night-air—which is etymologically noxious, but, in fact, purer, sweeter, and cleaner than day-air.

"Famous cricketers have died of consumption, and Prof. Kenwood has recently reminded us that Grace Darling died of consumption, at the early age of twenty-seven, 'all because she slept in a chamber little bigger than herself. The glorious fresh air of the Farn Islands availed her nothing, although she breathed it all day. She slept in a badly-ventilated room.' Remember that you spend one-third of your physical life in your bedroom. The percentage of carbonic acid will progressively rise in an unventilated bedroom from night to morning, as also the percentage of organic gases derived from the lungs and the surface of the body. The sleeper, therefore, suffers from progressive poisoning, by the reabsorption of his own gaseous excretions. All living things, without exception, from the microbe up to man, will die of continuous exposure to their own excretions. Man so dies in hundreds of thousands every year—not directly, but because he thereby renders himself unable to resist the

attacks of the tubercle bacillus. These myriads die of exposure to the night-air made in their own bedrooms.

"Carbonic acid is an anæsthetic and hypnotic. It exerts these merciful properties in the case of every death—the 'death-agony' being one of the lamentable myths which I might well discuss. Now it seems that very many people have acquired a drug habit in this respect: they will not thank me for stating the fact in that way. Nevertheless, they have taught themselves to require a high percentage of carbonic acid added to night-air in order to persuade them to sleep. This acts especially, I think, in the later hours of sleep, when sleep is naturally shallower, and when the percentage of carbonic acid is necessarily higher. The man who is trying to sleep with his bedroom window open finds himself waking too early in the morning, perhaps rather cold, and unable to get to sleep again. Even if he had wakened under the old conditions, the nice, warm, stuffy, foul air of his bedroom would probably have drugged him to sleep again. This, however, is a drug habit which can easily be overcome, especially if one avoids draught and getting cold. It is possible to sleep in pure air, as I fancy our remote ancestors proved.

"With the fact of consumption before me and its relation to this question, I scarcely feel inclined to spend space upon the malaise, lack of appetite, liability to catch cold, neuralgia, reduction in working power, and so forth—which are induced by the practice of spending one-third of one's life in foul air, and that the very third which should be devoted to recuperation under the best conditions. I can attempt to offer only the outlines of the subject here. There is need enough. The results of a statistical examination of the bedroom windows at night in Harley Street were—but I have exceeded my space."

It is remarkable that this fallacy should have survived the attack made on it so long ago as 1860 by Florence Nightingale in her *Notes on Nursing* (p. 12), "Another extraordinary fallacy is the dread of night-air. What air can we breathe at night but night air? The choice is between pure night-air from without and foul night-air from within. Most prefer the latter. An unaccountable choice. What will they say if it is proved to be true that fully one-half of all the disease we suffer from is occasioned by people sleeping with their windows shut? An open window most

nights in the year can never hurt anyone. This is not to say that light is not necessary for recovery. In great cities, night air is often the best and purest air to be had in the 24 hours. I could better understand in towns shutting the windows during the day than during the night, for the sake of the sick. The absence of smoke, the quiet, all tend to making night the best time for airing patients. One of our highest medical authorities on Consumption and Climate has told me that the air in London is never so good as after 10 o'clock at night."

"The day impurity in May is of the same order as the night impurity in November."—*Nature*, Sept. 29, 1921, p. 166.

That Whisky is an Antidote for Snake-bites

"Whisky and Snake-Bite.

All over the world whisky is supposed to be an excellent antidote for snake-bite. Recent experiments, however, performed by Dr. S. Allen, of Kentucky, with the copper-head moccasin seem entirely to refute this ancient belief. The animals employed for the experiments were the ordinary diet of the snake—live, full-grown rats. Dr. Allen made the following statement on the results of these experiments: "As to the action of alcohol, it caused the rats to succumb earlier to the effects of the snake-venom than did the rats that were bitten and injected and had no alcohol. Alcohol certainly did not have any antidotal properties, for mixing with the venom before injecting the rats did not modify its toxicity, and rats saturated with whisky before and after being bitten did not seem to have the same amount of resistance as rats that had no whisky." Snake-venom, Dr. Allen continues, weakens the heart and lowers blood-pressure, while the supposed remedy, alcohol, still further lowers blood tension and depresses the vitality of those defenders of the body, the white blood cells. The remedy advised is to squeeze the tissues around the bite, enlarge the fang-punctures by cutting, and suck the blood from the wound, provided there are no wounds or abrasions about the mouth or lips."—*T.P.'s Weekly*, July 16, 1909.

Andromachus, a native of Crete, who lived in the reign of Nero, invented theriaca, an alleged antidote for snake poison, which contained no fewer than 61 ingredients, the principal being [from which the name is derived] the dried flesh of vipers.

That it is Advisable to Stop the Cough of a Child

"Do not administer Paregoric or Syrup of Poppies, either of which would stop the cough, and would thus prevent the expulsion of the phlegm. The cough is only a symptom, and helps to clear the air passages while there is any phlegm in them. To stop it with 'soothing' medicines, such as are supplied by chemists, and sold as patent or proprietary 'remedies' for cough, is a most dangerous experiment to perform. A cough is an effort of Nature to bring up the phlegm, which would otherwise accumulate, and in the end cause death. Again, therefore, let me urge upon you the great importance of *not* stopping the cough of a child. You may give in an emergency Ipecacuanha Wine, which will, by loosening the phlegm, loosen the cough, which is the only right way to get rid of a cough. Thousands of children in England are annually destroyed by having their coughs stopped. Do not become alarmed because you do not see any expectoration. Children under five years old do not expectorate unless they are suffering from whooping-cough.

"In the former case the expectoration is swallowed; in the latter it is violently expelled."—Pye Chavasse, *Advice to a Mother*, 16th ed., by T. D. Lister, M.D., p. 234.

That "Brimstone and Treacle" is Good as a Medicine for Children

The following question and answer are quoted from p. 304 of the 16th edition of Chavasse's *Advice to a Mother*, by T. D. Lister, M.D.:—

Question.—"Is there any value in the traditional 'brimstone and treacle,' or sulphur, as a medicine for children every Spring and Autumn?"

Answer.—"Certainly not; if you wish to take away a child's appetite, to weaken and depress him, give sulphur. Sulphur is not a remedy fit for a child's stomach. . . . . In olden times poor unfortunate children were dosed, every Spring and Fall, with brimstone and treacle to 'sweeten their blood!' . . . . To dose a healthy child with physic is the grossest absurdity. . . . . Sulphur is both weakening and depressing, and, by opening the pores of the skin and by relaxing the bowels, is likely to give cold, and thus to make a healthy child a sickly one."

That if the Eruption of Shingles encircles the Patient it Kills Him

Pliny said of shingles " Enecat si cinxerit"—" It kills if it encircles." Dr. T. D. Lister says, " There are no grounds for the supposition, but the occurrence is a very rare one."

The medical term for shingles is *herpes zoster* and it is interesting to note that these Greek words mean " I creep " and " a girdle," while " shingles " is derived from the Latin word *Cingulum*, a girdle. The definition of herpes zoster in Quain's *Dictionary of Medicine* is " An acute vesicular eruption running round one half of the body, following a course determined by the structure of the nervous system and not by that of the skin." In an article occupying nearly a page and a half there is not a word in support of the popular idea.

J. B. Harrison, M.R.C.S., writing in *Chambers's Edinburgh Journal*, 1850 (p. 389), says, " . . . . there is a vulgar error, that if the eruption completes the circle, it is fatal . . . Fortunately this is not the case; but the complaint *does* seldom get quite round."

" The shingles usually embrace one-half the trunk of the body in the situation of the waist, and very rarely the whole trunk. The rarity of the latter occurrence has given rise to an unfounded notion, that if the circle were completed, the patient would die."—Erasmus Wilson, F.R.S., *On Healthy Skin*, p. 205.

That Pressing the Upper Lip will Stop Bleeding of the Nose

Dr. Leonard K. Hirshberg, A.B., M.D., writing in the *North American* of September 11, 1910, said:—

" Behind most of the medical fallacies of the day is faulty logic, cause and effect being confused or imagined, and hasty generalization doing the rest. A case in point is afforded by certain homely remedies for nosebleed, which will stop of itself in a few minutes in ninety-nine cases out of a hundred. Unaware of nature's skill as a healer, however, the sufferer is eager to give her aid, whereupon he presses his upper lip and, when the blood eventually stops flowing, believes it has ceased because he has ' compressed the arteries.' As a matter of fact, the arteries which reach the nose are deep in the face and utterly beyond pressure from without.

" Still another favourite method of stopping nosebleed is to drop a cold key or a piece of ice down the patient's neck,

while some folks advocate putting a toad on his head. But in this madness there is some method, albeit its advocates probably could offer no sensible account of the relation between cause and effect. A sudden fright or unexpected shock causes a spasmodic contraction of the small blood-vessels, which forces the blood into the larger vessels and gives the small ones time to repair injuries. A crack on the cranium with a brick or a boiler explosion next door would produce an equal shock and would be just as effective as a cure for nosebleed."

That Cooling Medicines ("Spring Mixtures") should be taken in the Spring

"There is a very common, and very old notion, that what are called *cooling medicines* should be taken at particular periods of the year, especially in the Spring. Every practitioner will occasionally be consulted on this subject, and very often a great disposition is shown by medical men to fall in with popular views. Many a poor child has been condemned to a pot of brimstone and treacle merely because it was the Spring-time. I imagine parents are not always ready to carry out these views in their own cases. Hippocrates advocates such a system in his 47th aphorism, Sec. VI., 'If bleeding or purging be requisite,' says he, 'Spring is the most convenient time for either.' . . . For my own part I don't see why we should take physic unless we are ill. The public have very curious, and, I should think, very ill-defined ideas of cooling physic, and of medicines for purifying the blood. That the ancients set considerable importance on seasons, will appear from the most casual inspection of their works." —J. B. Harrison on "Popular Medical Errors," *Chamb. Edin. Jour.*, 1849, p. 77.

That a Corn has Roots

"The common idea, I take it to be, is, that a corn grows from its roots as a tree does, and therefore it is necessary to extirpate the roots before a cure can be accomplished. . . . When a part is a good deal exposed to pressure, the cuticle becomes hardened, just as it will at the ends of the fingers in those who play on the violin; besides this, the papillæ of the subjacent true skin become enlarged, and give the appearance of roots when a section of a corn is made. This

is all the mystery. So that, let us cut as deep as we will, if we continue to wear tight boots and shoes, the corns will speedily re-appear. The kind of shoes which ladies are in the habit of wearing, which merely cover the toes, and therefore make all the pressure bear on that part, are exceedingly objectionable, especially where the shoes are pointed, and the leather strong."—J. B. Harrison, in *Chamb. Edin. Jour.*, 1849, p. 103.

The foregoing description of the structure of a corn agrees with that given in Quain's *Dictionary of Medicine* (1902).

That Hydrophobic Patients Bite those around them, and thus Communicate the disease

It is said that when someone told King George II. that General Wolfe (who gained Canada for England) was mad, he replied, " I wish he would bite some of the other generals ! "

" The notion that hydrophobic patients bite those around them and thus communicate the disease, is a popular error which I should think scarcely needs contradiction. However, it seems that the idea appeared worthy of contradiction many years ago. In the second volume of a work which Desault published—' Sur la Pierre des Reins, et de la Vessie '—in 1736, he treats of the hydrophobia, and alludes to this notion with the ridicule which it deserves."*—J. B. Harrison, in *Chamb. Edin. Jour.*, 1849, p. 103.

* Hamilton : *History of Medicine*, Vol. II., p. 257.

That, in the case of certain Diseases of the Eye, the Eye is Taken Out, Washed, and put back again

" People will tell you they have been present at surgical operations where the eyes have been cut out, a skin removed, and then replaced, as if nothing had happened. It is not always easy for a professional man to know how to answer such people. It would be a bore to both parties to enter into a serious refutation of the subject."—J. B. Harrison, *Chamb. Edin. Jour.*, 1849, p. 124.

The author can find no such operation referred to in the long article on the eye in Quain's *Dictionary of Medicine* (1902).

" It is hardly necessary to say that the eyeball cannot (as many people erroneously believe), without destruction, be moved forward or ' laid on the cheek,' since such a movement

would tear the muscles attached to it, and also the optic nerve."—Sir E. Ray Lankester, K.C.B., F.R.S., in the *Daily Telegraph*, June 26, 1911.

Even hospital nurses have told the author they have seen the eyeball so taken out and put back again, but Mr. E. Rock Carling, M.B., B.S., F.R.C.S., told the author that this was an illustration of how unreliable untrained observers are as witnesses, even though perfectly honest, for such an operation was quite impossible.

That it is Good to Feed a Cold and Starve a Fever

We often hear the above statement, " and many think this plan should be literally adopted, and proceed to act accordingly. I never properly understood the sense of the proverb until one of my professional friends explained to me that there was an ellipsis in the sentence, and that it should be understood as a brief way of saying, ' Stuff a cold and you will have to starve a fever ' ; that is, if you do not refrain from generous living during a cold, ten to one you will set up a fever in which you will have to abstain altogether. This is certainly a more sensible reading of it."—J. B. Harrison, in *Chamb. Edin. Jour.*, 1849, p. 141.

There is nothing in Quain's *Dictionary of Medicine* under " fever " and " cold " (nasal catarrh) which suggests that a patient should be " fed " or " starved " in either of these cases.

That Clever Children Die Young

" So wise, so young, they say, do never live long."
King Richard III., Act III., Sc. 1., l. 79.
" Whom the gods love die young."
Byron, Don Juan, IV., xii., 1.

Dr. J. B. Harrison says that delicate constitutions are not unfrequently associated with precocious minds, and that with scrofulous and consumptive habits there are often combined states of intellectual brightness which only render more deplorable the untimely death which ensues, but that this connection of premature indications of talent and early death is far from being a constant one.

The following few illustrations of great intellects which developed when their possessers were young will show that, fortunately, the statement in the heading is certainly far from true :—

Albrecht von Haller, physiologist and poet, 1708-1777.
Blaise Pascal, mathematician and theologian, 1623-1662.
Robert Boyle, physicist, 1626-1691.
Michael Faraday, physicist, 1791-1867.
Baron Liebig, chemist, 1803-1873.
John Stuart Mill, economist and logician, 1806-1873.
Edwin Landseer, painter, 1802-1873.
John Ruskin, writer and art critic, 1819-1900.
Benjamin Franklin, statesman, physicist, and author, 1706-1790.
James Clerk Maxwell, mathematical physicist, 1831-1879.
Victor Hugo, author, 1802-1885.
Count Rumford, physicist, 1753-1814.
Thomas Young (he was *Young* all his life!), physician, physicist, mathematician, and general scholar, 1773-1829.
Carl Linnæus, botanist, 1707-1778.
Charles Lyell, geologist, 1797-1875.
George Cuvier, naturalist, 1769-1832.
George Parker Bidder, "calculating boy" and civil engineer, 1800-1878.
Mozart, composer, 1756-1791.
Handel, composer, 1685-1759.
Leonardo da Vinci, painter, sculptor and engineer, 1452-1519.
John Flaxman, sculptor, 1755-1826.
Thomas Babington Macaulay, historian, 1800-1859. (At 8, he wrote a *Compendium of Universal History*; a *Treatise in Defence of the Christian Religion*; and a considerable portion of an epic poem. H. R. Allport at p. 6 of his *Macaulay* (1917), says, "Such fragments of the latter as I have met with display an extraordinary mastery of technique.")
Johann Wolfgang von Goethe, poet, novelist, and philosopher, 1749-1832. (Began writing at about 11.)
John Calvin, Protestant reformer, 1509-1564. (At 12 he was Chaplain to the Chapel of the Gésine.)

There seems to be an idea also that precocious children are not successful in after life, *e.g.*, Dr. Forbes Winslow was reported in the *Daily Graphic* of April 12, 1912, as follows:—

"Speaking on 'The Training of Children of Abnormal Physical and Mental Condition,' at Hull in connection with the annual conference of the National Union of Teachers yesterday, Dr. L. Forbes Winslow said that infant prodigies were, as a rule, abnormal persons to be dealt with in a different

manner to other children. Unfortunately infant prodigies were encouraged by many tutors and masters—a most unwise and reprehensible course. As a consequence their brain became so stunted in its development, from the constant educational pressure to which it had been subjected, that serious mischief must inevitably occur either in early manhood or in after life. Infant prodigies rarely justified their early promise.

"The infant prodigy was often the child of abnormal parents, and he had known many infant geniuses whose parents, either father or mother, had been inmates of lunatic ayslums."

The instances given hereinbefore seem to refute Dr. Winslow's opinion.

W. B. Drummond, M.B., C.M., in *An Introduction to Child-Study*, has a chapter on "Genius and Precocity" in which he says, "Whatever genius may be, it seldom delays till adult life to show itself. . . . statistics show clearly enough that genius is usually precocious. . . . A large proportion of scholars and men of science are precocious in childhood, . . . Although genius tends to be precocious, precocity by no means implies genius. . . . Galton's statistics show that very eminent men are, on the whole, of exceptionally good health and physique."

"Dr. Leonard Guthrie, lecturing to the Child Study Society on *The Nervous Child*, said there was no evidence in support of the prevalent idea that precocious children were subject to early death. Precocious, neurotic children might have transcendent gifts but never achieve anything, their versatility being a cause of failure by tempting them from concentration in one direction. Taciturnity was common in nervous children, and might be taken to indicate dulness, but many eminent men had habitually indulged in reveries and day dreams in their childhood. Indeed, hyper-sensitive children were unfitted for the ordinary routine of school life. Their intellectual powers were often high, and might be cultivated on the lines for which most aptitude was shown. He recommended judicious praise and encouragement and avoidance of forcing knowledge on clever, neurotic children. He was of opinion that nervousness was more connected with environment than with heredity, and that the neurotic temperament was inseparable from genius."—*Education*, Apr., 24, 1914. *Vide Nature*, June 16, 1923.

That Syphilis was Imported from the New World by Columbus

"Syphilis is a disease of remote antiquity, and is found all over the globe. . . . The extraordinary prevalence of this disease during the latter part of the 15th century led to the unfounded belief that it had come from the New World with the Spanish navigators, though the name *Morbus Gallicus*, or the Neapolitan Disease, was that now commonly given." —*Chamb. Ency.*, Vol. X., p. 35.

"The Scourge of Europe.

"The latest result of Prof. Metchnikoff's researches points to the possible extirpation of a terrible disease which has ravaged the civilised world ever since Columbus was erroneously accused of importing it from the New World. The subject cannot be fully discussed in any but a technical paper, but it is notorious that the public health of Europe has been seriously affected by this disease. Statistics have shown that in some cases as many as 20 per cent. of the men in our army have been treated in a single year for some form of it, which means that each of them is a possible source of offspring which will be severely handicapped in the battle of life. Every student of national health and efficiency knows that both are affected by possibilities of this nature.

"We now owe to Prof. Metchnikoff and his colleagues of the Pasteur Institute the promise that the dreadful scourge, which has baffled the efforts of medicine for so many generations, may be stamped out within the next century or less. About a year ago he was able definitely to announce that he had detected the bacterium to which it is attributable—a long, delicate, threadlike microbe, of extreme tenuity, which has been christened the 'Spirochæte pallida.' It had been seen before—being known from its first observer as the 'Schaudinn bacillus'—but its relation to the disease had not been definitely established.

"Experiments during the past year have been directed towards the discovery of an antitoxin for this disease. Monkeys are as subject to it as man, and the experiments made upon them have unfortunately given a negative result. But Prof. Metchnikoff—in conjunction with Dr. Roux—has just announced the discovery of a certain preventive, consisting in the application of an ointment of calomel and lanoline to the point of inoculation. This was successfully tried on monkeys. An heroic young medical student then

offered himself as the subject of a crucial experiment. He allowed himself to be inoculated with the 'Spirochæte pallida,' and was then rubbed with this ointment. After three months it has been proved that neither he nor a monkey which was similarly treated presented any symptom of the disease, whereas other monkeys which had been inoculated with the same virus, without protective treatment, were thoroughly infected.

"This practically establishes the truth of Prof. Metchnikoff's discovery, and points the way to the ultimate disappearance of one of the most cruel and persistent plagues which prey on mankind. Even the most thorough-going anti-vivisectionist can hardly deny that the monkeys concerned have suffered in a good cause; and as for Prof. Metchnikoff, hardly any honour is too great for the devotion and ingenuity with which he has tackled a problem comparable in difficulty and importance with those solved by Pasteur and Lord Lister themselves."—*Daily Mail*, May 25, 1906.

In the "History of Medicine" which forms the introduction to the *Cyclopædia of Practical Medicine*, edited in 1833 by John Forbes, M.D., F.R.S., Alex. Tweedie, M.D., and John Conolly, M.D., p. xliii., we read, "It is now generally agreed that it was near the close of the fifteenth century that the symptoms of syphilis were first recognised in Italy, from which country the disease very rapidly extended over the whole of Europe. Concerning its primary origin much controversy has taken place; many writers have attempted to prove that it was brought into Europe from America by Columbus; but this opinion which was at one time pretty generally received, is now abandoned, nor are we able to offer any plausible conjecture respecting its introduction from any other quarter."

That in the case of Monomania, if the Patient can be set right on the particular subject, a cure will be effected

"The public, and, I rather think, some medical men also, have what appear to me to be erroneous notions respecting monomania. Monomania, as the word implies, is madness on one particular subject; and it is often thought that if the patient can be set right on that particular subject, a cure will be effected. There is a story in the *Diary of a Late Physician*, which, if I remember it rightly, turns on this

idea. A man is represented as imagining his head to be placed on his shoulders, the wrong way. For this insane idea a physician is consulted, who hits upon an expedient which is attended with the happiest results. The physician enters into his patient's conceit, condoles with him on his misfortune, and assures him that nothing but a severe operation can possibly rescue him from his calamity. The operation is no other than that of turning his head back to its right place. A room is accordingly darkened, and by the aid of an electric shock he is made to suppose that his head is wrenched round to its former position. His dress, which he had worn to correspond to his own notions, being at the same time set straight. This completely disabuses him of his delusion, and he rises a changed man. The story is called the *Turned Head*. It is rather too bad to spoil a good story, and especially as it is the only funny one in a remarkably pathetic book; yet truth must be told. It must be owned that a lunatic will often manifest his insanity principally, or even solely, upon one topic; but I think it will be found that the subject in question is the one in which he is chiefly interested, and that if he could succeed in diverting his mind from it, the insanity would show itself on the next topic which interested him. It is not, in point of fact, the dwelling on the individual topic or single subject which constitutes the disease, but the habit of the mind to dwell morbidly on whatever interests the most. . . . .

The minds of people who have these peculiar dominant ideas, I think, would be generally found not correct on others, if scrupulously examined; and in this opinion I find I am borne out by the late able Dr. Pritchard. The wrong notion is not, then, as some people imagine, a mere single error, but an indication of faulty direction of mind, which, as I have said, might manifest itself in various ways, and is probably more or less incorrect in all."—J. B. Harrison, M.R.C.S., in *Cham. Edinburgh Journal*, 1850, p. 389.

"Essentially the condition is chronic, and restricted to a fixed delusion upon one subject, but it is erroneous to think that the victim is of sound judgment and healthy feeling on all others . . . . The term Paranoia has been applied generally to all chronic cases of insanity, whether primary, or secondary; and it has been made to include all borderland cases, eccentrics, cranks, grumblers, letter-writers, and crazy persons of all sorts, more especially those who avow their

belief in symbolism and allegorical expressions and figures. Persons evincing unfounded and unreasonable credulity, those who believe in fetishism and who embrace mystic and occult dogmas have been brought into the same class, the reason being that an anachronism is looked upon as a morbid character; that a belief in alchemy, or in the power of magnetism and electricity, which was compatible with high intellectual ability several centuries back, is now a sign of atavic degeneracy and that the acts of chronic lunatics are reversions to earlier conditions of the human race; and that the delusions of persecution so frequent in this class are a survival of struggles for existence which were necessary in ancestral days and lawless times, but which are now only an indication of perversion and degeneration."—Quain's *Dictionary of Medicine*, p. 763.

That Cancer is Hereditary, that it can be produced solely by a Pinch or Blow, that it is confined to mankind and to White Races

It is due to the kind assistance of Dr. E. F. Bashford, the General Superintendent of Research and Director of the Laboratories of the Imperial Cancer Research Fund, that I am able to deal with this subject, by quoting from a number of publications which he sent to me.

Taking the publications in chronological order, the first quotation is from p. 5 of *Real and Apparent Differences in the Incidence of Cancer* by Dr. E. F. Bashford (Transactions of the Epidemiological Society of London, N.S., Vol. XXVI., 1906-7).

"The belief was at one time general that the disease was peculiar to mankind, but cancer is now known to occur throughout vertebrate animals."

p. 30 *ibid.* (Dr. Payne when taking part in the discussion of Dr. Bashford's paper said): "In 1884 Dr. William Ogle remarked on the supposed increase in cancer. He (Dr. Payne) did not believe that there was really an increase, but that the apparent increase was entirely due to improved diagnosis. He made the remark also that the increase of cancer was more marked in the male than in the female, because cancer in the female was accessible, whereas the greater portion of cancer in males occurs in inaccessible parts of the body, *e.g.*, the abdominal organs; this, therefore, was

the reason, he said, for the apparent increase being chiefly in the males."

The *Third Scientific Report on the Investigations of the Imperial Cancer Research Fund* was issued in June, 1908, and contains 484 quarto pages. Quoting from the introduction by Dr. Bashford, we obtain the following information :

p. x. " Neglecting cancer in animals—although generalisations to carry any weight at all must be extended to them—and to take but three examples in the case of man, cancer of the skin of the abdomen is practically unknown in Europe, yet it is most extraordinarily frequent in Kashmir ; this is not due to a distribution of congenital ' germs ' in the skin of the abdomen of Europeans and natives of India other than in Kashmiris, but to the fact that the latter irritate the abdominal wall by wearing a charcoal oven round the waist and the former do not. Cancer of the floor of the mouth is rare in European women, although not uncommon in men ; but in Ceylon and India generally, the women suffer to a high degree from cancer of the inside of the mouth. Again, this is not due to developmental differences between women in England and those in India, but to the fact that Indian women chew betel-nut and sleep with the plug in the cheek at the exact spot where cancer starts. In needle-women melanotic sarcoma often develops in the fingers at the site of frequent puncturing by the sewing needle.

p. 21, *ibid.* " The relation of these different forms of chronic irritation to the development of cancer in different parts of the world helps us to comprehend better the part played by other forms of chronic irritation whose association with cancer has long been observed. These irritations may be mere direct *physical* injury as in fracture of bone or in the ' horn core ' of cattle in India [Squamous cell carcinoma develops at the root of the right horn with great frequency in cattle used for draught purposes—the right horn being used by the natives to attach the animals to agricultural implements or draught-waggons], *chemical* as in paraffin, petroleum, arsenic, and aniline cancer, *actinic* as in the case of the short hot clay pipe, the Kangri [charcoal oven] the X-ray, or brand cancers (of cattle)."

The next matter is from the *Proc. of the Roy. Soc. of Medicine*, Jan., 1909, being the opening, by Dr. E. F. Bashford, of a discussion entitled " Heredity—Cancer."

p. 3. " There is certainly no evidence for the inheritance

of cancer as such—only the possibility of a predisposition can be discussed . . . ."

p. 4. "There is no analogy with any known form of infective disease; and this being so, we may seek primarily for the cause of cancer within the body itself, in the biological properties of its cells as contrasted with exogenous causes.

"The fact that cancer may develop as a response to diverse external agencies, acting as mediate causes, is thereby not excluded, although its ultimate origin is sought in a biological alteration of what were normal cells. This conception of the origin of cancer seems to indicate that a variable, and perhaps inherited, predisposition or vulnerability towards excitants is not a possibility to be lightly dismissed."

p. 5. "Thus the chance, assuming no more heredity than is shown by an average member of the entire population, that a man over 35 will die of cancer is 1 in 11, and the chance for a woman above the same age is 1 in 8 . . . .

"The foregoing table establishes the fact that, when no hereditary influence is assumed, the frequency of cancer as a cause of death is so great that few families of large size escape . . . ."

p. 8. "These 358 cases of cancer are therefore to be regarded as sporadic cases, without heredity; 358 cases without family taint out of a total of 669 families is such a high proportion that if such records are to be relied upon a family taint evidently is not the sole foundation upon which cancer develops."

p. 9. "And he [Weinberg] concludes that heredity does not play a dominant part."

p. 10. "There is, in short, no evidence of cancer arising as a transmissible variation. It seems then that cancer is probably always acquired."

Referring to the thousands of experiments on mice, Dr. Bashford says (p. 12 *ibid*), "Thus far there is no evidence that the liability to carcinoma has been enhanced by systematic in-breeding. I do not wish to anticipate the results of our observations, which are still continuing, but we have not as yet obtained even an indication that cancer is inherited. . . . and in which the bogy of inherited predisposition—the dying echo of ancient constitutional conceptions of cancer as a blood-disease—plays no part whatsoever."

The next is from an address by Dr. E. F. Bashford on *Cancer in Man and Animals*, and published in *The Lancet* of Sept. 4, 1909, p. 691 :—

" Reasoning can no longer commence with the postulate that the disease is limited to the white man and, in consequence of his transmitting it, to races living under the circumstances peculiar to his particular form of civilisation, and to his domesticated animals. On the contrary, the liability to cancer of all races of mankind and all vertebrates, even when living in natural conditions, has been established as a fact from which all attempts to explain the disease must start. . . .

" There is no doubt that an absolute increase of the number of cases of cancer *recorded* from year to year is taking place not only in practically all races of mankind, but also in vertebrate animals. Nevertheless, to alarm the public by proclaiming this as ' an increase of cancer ' in the sense that there is an increase disproportionate to the numbers and age-constitution of the populations examined is pure sophistry. . . . a real increase cannot be proved, and what has been made a cause of public anxiety appears to have little or no existence in fact." . . .

p. 698. " The study of the incidence of cancer as determined by irritants in man demonstrates that the generalisation of the idea of a congenital or embyronic origin is incorrect."

From the *Eighth Annual Report* of the Imperial Cancer Research Fund, July 20, 1910, we quote a summary of the experiments, numbering *tens of thousands!*, on mice (p. 8), " Analysed so as to bring out the liability to cancer according as the young were born before or after it appeared in the mother, the figures show a higher incidence in those born before the mother developed the disease. Since the conditions necessary for contagion were present, the opposite result would have been obtained had any analogy existed between cancer and the recognised infective diseases."

The 3rd annual report of the Harvard (U.S.A.) Cancer Commissioners, issued in Nov., 1904, does not tend to confirm the supposed relative increase of cancer.

In all these quotations, and the much larger amount of matter which we have read, there is no mention of a blow or pinch producing cancer in the breast or anywhere, on the contrary the cause of the irritation has to be chronic or long continued.

At pp. 101-2, *Nature*, July 21, 1923, there is an article by " W. B." on " The Problem of Cancer," in which the position of cancer research is summed up, and from which we abstract

the following: "There was a time when the word 'tumour' was used to include almost every kind of abnormal swelling that was more or less circumscribed. A great many such swellings have now been separated off, as they have proved to be of inflammatory nature. . . ."

The growth of every tumour "is progressive and unlimited. The cells of which every tumour is composed are bolshevistic, anarchical, or autonomous in varying degree. The laws that govern the behaviour of the cells of a tissue towards each other or other cells are violated. The tumour cells are in some mysterious way set free from restraining influences, and, having attained their liberty, behave in a riotous rather than in an orderly manner. . . If left to themselves, even the most innocent tumours grow progressively, and may become harmful in virtue of their magnitude. Some of the largest tumours known are benign in a clinical sense, while some of the smallest in point of size may be of deadly malignancy.

Of the origin of malignant growths it is said, "(1) It is widely held that some irritation, physical or chemical, applied over a long period may incite an abnormal blastomatous course. In the last few years many experiments have concurred to show that tar products may be active incitors to tumours both in men and animals. . .

"(2) A second current of thought has centred round the possibility that tumours, and especially cancers, are due to an exogenic parasite of some kind. . . Many attempts have been made to find parasites. . . No one has found a parasite in the cells of a tumour which produces a similar tumour in the homologous or heterologous species.

"(3) The failure to find a parasite led to another theory—that tumours arise from some embryonic aberration. This view is associated with the names of Durante and Cohnheim, and in certain cases is undoubtely to be accepted as the probable cause. . .

"Another line of work has concerned itself with the growth of tissue *in vitro*. It is probable that much light will be thrown upon the whole of the blastomatous processes by work of this kind. . .

"The main point, however, is that all over the world the highest class of scientific workers are busily engaged in trying to solve one of Nature's greatest mysteries which affects both men and and almost all known animals. . . ."

The following hints for the prevention of cancer were

given in 1912 by Dr. J. Fletcher Little, medical officer of health for Harrow-on-the-Hill :—

"When warts, moles (especially dark coloured), and other skin growths are exposed to constant irritation they should be immediately removed.

"Avoid excessive smoking, as it predisposes to cancer of the lips, tongue, cheeks, etc. Inhaling cigarette smoke tends to cause cancer of the vocal cords.

"Avoid irritation of the tongue and cheek by broken, jagged teeth.

"Take great care of the back teeth or grinders. Money spent on the teeth will bring a greater return than any other investment.

"Avoid excessively hot food and drink, which induce cancer of the throat.

"Avoid taking large quantities of iced drinks and ices.

"Masticate all food thoroughly, as food imperfectly chewed causes chronic irritation of the alimentary canal.

"Avoid alcoholic drinks, as they are a predisposing cause of cancer, and diminish the average prospects of survivial by 30 per cent.

"Do not delay when cancer is suspected. Early recognition and prompt removal deprives cancer of its terrors."

That the Crisis in such Diseases as Pneumonia Always Occurs on an Odd Day

"To take up another of the million fallacies which decline to die of old age or succumb to the teaching of science ; just as, 200 years ago, the belief prevailed that the seventh son of a seventh son was foreordained for the medical profession, so to-day many persons believe that the crisis in such diseases as pneumonia always comes on an odd day—the third, or the seventh, or the ninth. One idea is as ridiculous as the other."—Dr. Leonard K. Hirshberg, in *The North American*, Sept. 11, 1910.

That Measles is a very trivial Disease

"'Years ago I did not think measles was a serious complaint,' said a woman named Cooper to the Marylebone coroner to-day. 'But I do now.'

"On Friday, she said, her daughter, aged four, was taken ill with measles, but the witness, thinking the girl was progressing well, did not send for a doctor until the following day. Then she learned that the child was dying.

" ' There are two more lying dead at home,' added Mrs. Cooper. ' One died on Monday, and one yesterday.'

" The verdict was Death from natural causes."—*Evening News*, Mar. 8, 1911.

Possibly the explanation is that measles *per se* is not so dangerous, and that the danger lies in the complications which may arise. Even this view is not correct, for Dr. J. J. Ridge, in his *Medical Temperance Dictionary*, states, " The severity or malignancy of the epidemics varies considerably : some have been very fatal." He goes on to say that diarrhœa is a frequent complication and " There are sometimes other complications which are the source of much danger. Pneumonia and capillary bronchitis are the most serious and often prove fatal."

" . . . In the treatment of measles the great thing is to guard the patient against cold, so as to escape the lung inflammations."

Dr. John Abercrombie, M.D., F.R.C.P., in Quain's *Dictionary of Medicine*, holds the same opinions and both state that whooping cough seems peculiarly liable to follow in the train of measles. Dr. Abercrombie also states, " There is additional danger when measles follows upon scarlet fever or diphtheria. . . . the popular theory that the other children had better take the disease and have done with it should receive no practical support from the medical practitioner."

It was reported in the daily press in Feb., 1913, that in London during the 5th and 6th weeks of the year, 1913, 56 and 54 deaths, respectively, occurred from measles, and that during the week ending Feb. 8, 1913, there were 200 deaths from measles in 96 great towns of the country, while during the same period the number of deaths from enteric, small-pox, scarlet fever, whooping cough, diphtheria, and diarrhœa together was only 245.

Vide Daily Mail, May 23, 1921.

That the Wearing of a certain kind of Metallic Ring will prevent the Wearer from Suffering from Rheumatism or Cramp

Formerly, in England, the King used to bless rings for distribution among people who accepted them as infallible cures for cramp.

The Rev. T. F. Thiselton Dyer, M.A., *Domestic Folk-lore*, p. 97, " In days gone by, too, ' medicated rings ' were held in great repute, and were much used for the cure of diseases, instances of which we find among the remedies *still in use* for cramp, epilepsy, and fits," and in the Army and Navy Stores on Mar. 29, 1909, the author saw such rings for sale. They were labelled " Lion Anti-Rheumatic Rings ; gold, 8s. 6d. each ; plain, 4s. 6d. each," and in *The Agricultural Economist and Horticultural Review* of Feb., 1912, there appeared this advertisement, " Genuine Anti-Rheumatic Rings, 2s. each. Send size. Hickman, Abbott's Road, Southall."

It is sometimes alleged that the supposed action is due to electricity and that some of the rings are made of two metals, so as to form an electric couple. Even if this be so, the current would be so microscopic as to be useless. This theory cannot always have held, however, for Bacon mentions that, " There are two things in use to prevent cramp, viz., ring of sea-horse teeth, worn upon the fingers, and fillets of green periwinkle, tied about the calf of the leg, the thigh, &c., where the cramp usually comes. This seems the more strange, because neither of them has any relaxing virtue, but rather the contrary ; whence they appear to operate rather upon the spirits in the nerves than upon the substance in the nerves themselves."

Paracelsus had a ring made of a variety of metals, which he called electrum, and stated that rings so composed would prevent the wearers from having cramp, palsy, apoplexy, epilepsy, or any pain. Even more, if the ring were put on a finger of a person during an epileptic fit, it would immediately assuage the disease and terminate the fit !

Vide Credulities Past and Present, by William Jones, F.S.A., and *Life of Benvenuto Cellini*, p. 289.

That Smoker's Throat is Related to Cancer or Tuberculosis

Smoker's throat is common. It is chronic catarrh of the pharynx and may be due to various causes, among which are tobacco smoke and spirit drinking. In the more severe forms hypertrophy of the mucous glands leads to a tuberculated appearance of the mucous membrane. There is also a thickening of the membrane in tuberculosis of the pharynx, hence no doubt the popular but erroneous idea that these two diseases are related.

That an Aching Tooth should Not be Extracted "Until the Swelling has gone down."

"This fallacy is held by quite well educated people and its origin is difficult to account for. The swelling indicates an abscess at the root of the tooth and is due to an abscess cavity and swelling of the tissues around. Pus, wherever it is, must always be evacuated and the best way of doing so in the case of a tooth is its removal. If this is not done the abscess may point at the side of the tooth, open, and discharge (gum boil) or it may break into the cellular tissue, causing general septic poisoning, often serious, and in some cases fatal."—A. Percy Allan, M.D.

That Persons Suffering from Epilepsy have High Palates

I am indebted to Mr. C. E. Wallis, M.R.C.S., L.R.C.P., L.D.S., for this fallacy. He tells me that his investigations have shown clearly that the statement is untrue.

That when Children Grind their Teeth in their Sleep it is a Sign that they have Worms

"This symptom is not necessarily dependent upon disease, as it may occur in excitable children during sleep, and is often an indication that too much excitement or fatigue has been permitted. Grinding of the teeth may be observed at all ages, and in many different complaints. It is commonly present in cases of cerebral disease and of intestinal disturbance, being often, and probably erroneously attributed to the presence of worms. . . .

"The treatment of teeth-grinding consists in the correction or removal, if possible, of the condition upon which it depends."—Quain's *Dictionary of Medicine*, p. 1673.

That "Dead" Teeth Do Not Ache

By "dead tooth" is usually meant one of which the nerve (pulp) is dead.

C. E. Wallis, M.R.C.S., L.R.C.P., L.D.S., writing on Jan. 27, 1910, said, "The tooth may have a living membrane (dental periosteum) round it and if this becomes inflamed, pain will result, even if the tooth is dead." Quain's *Dictionary of Medicine*, p. 1671, entirely corroborates this.

In connection with this fallacy it may be recorded that in *The People* of Jan. 25, 1914, there was a paragraph to the

effect that a skull had been dug up in a Donegal garden and was supposed to be a relic of a monastery. It had been found some years previously by a man who brought it home and took a tooth out of it to carry about as a charm against toothache. Having extracted the tooth he buried the skull.

That Venereal Diseases can be Cured by Communicating Them to Innocent Persons

" Well, well ; as for him, he brought his disease hither : here he does but repair it."—Pericles, IV., ii., 108.

A more terrible example of a *dangerous* fallacy probably cannot be found, and one can only hope that criminal law has means of correcting such life-wrecking and vicious ignorance by heavy penalties.

Dr. A. Percy Allan, writing on Sept. 11, 1913, said, " This is a relic of the old savage belief, still held by primitive peoples, that all diseases may be so cured, being due to an evil spirit or witch influence imposed from without. The belief as affecting syphilis and gonorrhœa, is still extant among the people of Europe of the uneducated classes, and often explains sexual assaults on children of both sexes in our country and on the Continent of Europe." Writing on Aug. 2, 1919, Dr. Allan said he had recently found this belief among women. *Vide Daily Mail,* Mar. 10, 1921, and Ministry of Health Report on Venereal Disease (1923), H.M.S.O., 3d.

That the presence of Ozone in Air which is Breathed is Healthful and Invigorating

Sir Ray Lankester, F.R.S., writing in the *Daily Telegraph* of Feb. 26, 1912, " It has now been shown experimentally (a paper was read on the subject to the Royal Society only three months ago), that the presence of ozone . . . in respired air in even very minute quantities acts as an irritant to the air passages and is highly injurious. It produces no effect whatever on the respiratory processes which go on in the lungs, but it is not altogether negligible from the point of view of fresh air and ventilation."

" As prepared by any of the [five] methods described, ozone is always mixed with a large excess of unaltered oxygen, probably never less than 80 per cent. of the latter gas being present. Even in this state of dilution it has a strong and rather unpleasant smell, which rapidly produces headache.

When inhaled it irritates the mucous membranes, and is rather suggestive of dilute chlorine."—G. S. Newth, F.I.C., F.C.S., p. 174, *Inorganic Chemistry.*

When used for the treatment of open and suppurating wounds the results appear to be admirable.

Drs. Leonard Hill, F.R.S., and Martin Flack, M.A., B.Ch., read a paper, entitled "The Influence of Ozone in Ventilation," before the Royal Society of Arts on Feb. 7, 1912, from which the following is excerpt :—

"On exposing mammals to different concentrations of ozone in our chamber, we have found they may be killed by prolonged breathing of concentrations of about twenty parts per million. The cause of death is an acute irritative inflammation of the respiratory tract. . . It is so irritative and unpleasant that no one would think of continuing to breathe it. Thus a man cannot be poisoned unawares by a dangerous concentration of ozone. He will certainly remove himself from its presence. . . . Ozone is a most powerful deodoriser. It takes away all disagreeable smells. . . . By the smell (of ozone) we can detect concentrations of far less than one part in a million, and the smell is the safest and easiest guide to a suitable concentration. Ozone should be present in the air for continuous breathing in concentrations not greater than that scarcely perceptible to the smell. Concentrations of even one part in the million are too irritative, and quickly depress the metabolism and lower the temperature of rats, and are unpleasant to man. . . . Very weak concentrations, barely perceptible to the smell, have no ill effects."

That the Air at Seaside Places contains Ozone

"The existence of ozone in air has always been doubtful, the chemical evidence for its presence being quite unsatisfactory. Recent research shows that it is never present below altitudes of 8,000 feet. The smell attributed to it at the seaside really arises from decaying sea-weed."—*University Correspondent*, July 1, 1914.

That a good blowing of Fresh Air through a Room in which there are Disease Germs is, in all circumstances, a Good Thing

"It is a common belief that disease germs of one kind or another may be thrown off by persons in whom they exist into the air of a room and float into every part of it,

and consequently that a good blowing of fresh air through a room will get rid of the danger of their possible presence. This belief has been inquired into and found to be not merely erroneous but the reverse of what actually occurs. Disease germs fall rapidly to the ground ; even when thrown into the air by coughing or sneezing they do not travel more than three or four feet. On the other hand, the stirring up of dust by a strong current of air from an open window—especially during the ' sweeping ' of a room—does disseminate in the cloud of dust raised many germs (bacteria) which are present in the dust. Wet sweeping and cleaning are, therefore, to be preferred to dry, and the shaking of carpets should be carried on in the open air at a distance from human contact." —Sir Ray Lankester, F.R.S., in the *Daily Telegraph*, Feb. 26, 1912.

That after being Out in Severe Cold Weather, or Rain, the Best cure is a Warm Room, Warm Spiritous Liquors, a Warm Bed with Additional Clothes, and the use of Mudge's Inhaler

The above are the words of Dr. John Jones (*Medical Vulgar Errors Refuted*, 1797, p. 79), and so are the following :—

" This is all wrong, and the direct way to bring on a catarrh and all the ill consequences of taking cold ; which may be avoided by keeping quiet and cool, in cool rooms ; and by all means avoiding a quick transition into a warm temperature. It is well known that frozen limbs have mortified by being brought near a fire, or put into warm water, that would not at all have suffered if they had only been rubbed with snow.

" I have a hundred times, in very severe winters, escaped colds, after having not a dry thread about me (as the saying is) for several hours, by stripping myself when I got home ; putting on a dry shirt ; going to bed for half an hour, or just as long as the weather-side of me would take up in acquiring a degree of warmth equal with the other, to avoid a rheumatism of the part ; immediately then getting up, putting on dry clothes, and going out of doors about my business, without suffering the least injury."

That Influenza is a New Disease, never known in this Country until about 30 years ago

The writer well remembers the " rage " there was in connection with influenza about 30 years ago when it was

called " the flue," and " la grippe," and was certainly looked upon as a new addition to the ills flesh is heir to, hence he was greatly amused to find the following in *Medical Vulgar Errors Refuted* by John Jones, M.B., and published, mind, in 1797, (p. 81) :—

" *That the Influenza is a very dangerous distemper, and a new one ; never known in this country till a few years ago ; at which time the College, by their circular letters, cried out for help from all quarters ; were themselves greatly alarmed ; and spread a general terror.*"

" It is neither a new nor a dangerous distemper," wrote Dr. Jones ; " every person going out of a warm room, and riding, by night, against a sharp easterly fog, who had not prudently guarded his nose and mouth from it by a thin soft handkerchief, must have caught it ; and so may anyone in such circumstances catch it ; whether under the new name of influenza, or the old common one of catarrh."

" Influenza, an infectious epidemic disease which received its present name from the Italians in 1741. In 1889, an alarming epidemic appeared in the Far East, and swept over Europe with extraordinary rapidity. Since then it has appeared epidemically every year in some part of the British Isles, and generally has been very widespread."—*Harmsworth Encyl.*

" Influenza.

" The subjoined clipping from *The Manchester Weekly Times*, Saturday, Sept. 2, 1916, seems worth reproducing in ' N. & Q.' :—

" ' Another item of extreme interest [in an eighteenth-century diary discovered among a lot of old books belonging to Mr. Jas. Spratley, a member of an old family of Kingston-on-Thames] is the discovery that the word ' influenza ' was used in those days to indicate a very severe cold :—' I was seized with a violent fever and cold Nov. the 4, 1775, about 3 o'clock in the morning. Laid in bed till half-past one o'clock Sunday. Remained ill some time. The name of the disorder was called ye influenzi.'

" ' Fred L. Tavaré.

" ' 22, Trentham Street, Pendleton, Manchester.

" [The ' N.E.D.' notes that the word became popularized in England from the severe visitation of the disorder in 1743.] "—*Notes and Queries*, Oct. 21, 1916, p. 328.

Vide also the *History of Epidemics in Britain* by Creighton, Vol. II., p. 304 ; and an article on Influenza at p. 146 of *Nature* of Oct. 24, 1918.

" Sir Thomas Browne's health began to fail some years before his death. In Jan., 1679, he had a severe illness, which had scarcely passed away, before a fit of influenza laid the household low, sparing, however, little Tomey."—*Life of Sir Thomas Browne,* by Edmund Gosse (1905), p. 164.

That a Dram of Brandy is of Service in Warm Weather, as it is Cooling ; in Cold Weather, as it Warms ; in setting out on a Journey ; in coming home off a Journey ; at rising in the Morning, and going to bed at Night ; after goose, because it is hard of Digestion ; and after Fish, because it digests too fast ; and upon a variety of other occasions.

The above are the words of Dr. John Jones in his *Medical Vulgar Errors,* published in 1797. They only need the word " whisky " to be substituted for the word " brandy " and then they are up-to-date ! They remind one of the painting in the National Gallery, by George Cruickshank entitled *The Worship of Bacchus,* and painted by him in 1862. The sarcasm and absurdity should be enough to satisfy most people. Dr. Jones was brief on the subject, for all he wrote was, " This, like tobacco, gains upon us by habit, and seems at length to become almost necessary, though both at first wantonly introduced by young people without any reason for either."

That Nobody can Dispute the Absolute Necessity of a Dram of Gin for a Colic

Again the words are those of Dr. John Jones (p. 94, *ibid.*), who continues thus, " This proceeds upon the notion that all colics arise from flatulency. Common sense ought to convince us that in colics attended with inflammation, this panacæa must be of a fatal tendency."

That to Prevent a New Born Baby from Catching Cold it is necessary to Wash its Head with Brandy

" It is *not* necessary. The idea that it will prevent cold is erroneous, as the rapid evaporation of heat which the brandy causes is more likely to give than prevent cold."—Pye Henry Chavasse, F.R.C.S., p. 6, 14th ed., *Advice to a Wife.*

That Bacteria long remains Suspended in the Air of a Room

Bacteria though so small are heavier than air, consequently the all pervading force of gravity acts on them and they fall until they rest on some object, such as the furniture or the floor. A strong current of air through the room may raise the dust and with it the bacteria too, but we are assuming the air of the room to be reasonably at rest. It is because of this action of gravity that, contrary to the popular idea, the air of sewers is remarkably free from bacteria under ordinary conditions. The reason for this is that the walls of the sewers are moist, and once gravity has caused the bacteria to settle on them, they stick there. Tyndall experimented with this subject and coated the walls and floor with glycerine. The air of the chamber thus became practically sterile.

The number of bacteria in the atmosphere decreases rapidly as we ascend from the ground, the number at a height of 300 ft. being much smaller than at ground level.

Further information will be found in *Bacteria and their Products*, by Prof. Sir German Sims Woodhead, M.D.

That Dental Bridges are the Invention of an American

C. E. Wallis, M.R.C.S., L.R.C.P., L.D.S., read a paper entitled *Ancient and Modern Dentistry* before the Metropolitan Branch of the British Dental Association on Feb. 24, 1915, which was published in the *British Dental Journal* of Mar. 15, 1915, from which we quote the following :—

" Many people have thought that the making of dental crowns and ' bridges ' was introduced to mankind by our American cousins, but in various museums of ancient Greece and Rome are to be seen excellent examples of gold bridges and artificial teeth, such as were probably used by the plutocracy, if not by the aristocracy, of those early days. . . .

" The ancient Etruscans appear to have been highly skilled in dentistry and many specimens have been found in tombs in Etruria of gold dental bridges and similar appliances employed to replace lost teeth. In the villa of Pope Julius III. in Rome, now used as an Etruscan museum, is to be seen an excellent specimen of a gold dental bridge in actual position in a skull which was found in an Etruscan tomb at Civita Castellana, a town in Etruria formerly known as Falerii. . . .

" The so-called ' crown and bridge work,' which we have

shown, existed as far back as the ancient Etruscans, was revived by our American cousins in the sixties, . . . "

That Strictly Speaking Certain Diseases are Hereditary

" There are still other types of modifications which are sometimes regarded as heritable. We frequently hear, for instance, of hereditary disease. Several members of a family die of consumption, and we say the disease has been inherited. But on examining such a case, it appears that we cannot strictly speak of consumption, or in fact of any disease, as hereditary. Consumption is due to a special microbe, which must somehow be introduced into the system before the disease can appear. Sometimes it may be introduced from the mother before the birth of the child, but even in this case we cannot regard the disease as inherited, since all that occurs is the transference of the parasite from one person to another.

" It is known, however, that certain people are much more liable than others to contract certain diseases, and that this *liability* is frequently strongly inherited. But this liability is an inborn quality, so that its inheritance has nothing to do with the present question."—J. A. S. Watson, B.Sc., F.R.S.E., *Heredity*, p. 42.

That a Small Wound in any part of the Body may be Safely Neglected

This is one of the dangerous fallacies, for if even a small wound becomes infected it may lead to considerable trouble, such as blood poisoning. It is particularly dangerous to neglect a burn. This fallacy seems to be akin to that (q.v.) of thinking that a mild case of a disease can produce only a mild case in another person. The wound produced by the extraction of a tooth is not large, but cases are on record of patients dying of blood poisoning as a result of having decayed teeth extracted.

" Similarly, tetanus bacilli remain localised in some wound, often quite small, and manufacture their toxin, which in the same way pass in and poison the tissues."—Dr. W. E. Carnegie Dickson, M.D., F.R.C.P. Edin., p. 56, *Bacteriology*.

" . . . wounds with garden or farm implements, especially if penetrating deeply—even though comparatively small—or with much contusion or laceration of the tissues, are most liable to be followed by tetanus."—*Ibid.*, p. 74.

Tetanus is lockjaw, a most fatal disease if not immediately treated by the modern anti-toxin method.

That Adults do not catch Diphtheria.

Dr. E. Graham Little, M.D., F.R.C.P., wrote, "Adults not infrequently take diphtheria, but do not as a rule suffer so severely as children."

Quain's *Dictionary of Medicine*, p. 404, states that "$\frac{3}{4}$ of the cases are of children under 10," while *Ency. Brit.*, 11th ed., VIII., p. 291, states that, "Children are far more susceptible than adults," implying that adults do suffer from the disease, and (p. 293), "Adult patients have described the relief afforded by inoculation; it acts like a charm, and lifts the deadly feeling of oppression off like a cloud in the course of a few hours."

Princess Alice, the second daughter of Queen Victoria, died of diphtheria at the age of 35, having taken it from several of her children. Her husband, Prince Louis of Hesse, also caught it.

That the Eating of Green Apples commonly produces Colic.

"Almost everyone firmly believes that children must not eat green apples because if they do they will get colic. I have gone over much of Ontario, and a good part of the United States trying to find some one person who knew at first hand of a child having colic from eating green apples. It seems to be all tradition. I asked one of the most noted doctors in Minnesota if he ever knew a child to have the stomach ache after eating green apples. 'Well, I remember one child that vomited very much after eating green apples, but when I investigated the matter I found that it had eaten ripe apples and that he had bitten them in such chunks that he could not digest them.' My children have been brought up on green apples, and are very healthy, not because they eat green apples, but because green apples do not produce colic."—Dr. H. W. Hill, London, Ontario, Nov. 4, 1915.

"A common cause of intestinal colic is lead poisoning. . . .

"It is produced by many purgatives. It also occurs in inflammatory conditions of the bowel, in the enteritis due either to the ingestion of irritating or indigestible material, unripe or over-ripe fruit, or decomposing food, or to exposure to chill; in the enteritis of children often produced by

improper feeding. . . . "—Dr. Herbert P. Hawkins, F.R.C.P., in Quain's *Dictionary of Medicine.*

That Back-ache Indicates the presence of Kidney Disease

" Another very prevalent idea is that back-ache indicates kidney disease. Back-ache arises from a great many different causes, mostly muscular. When you have back-ache you cannot always tell why, but you can be almost always certain that it is not from the kidneys. The kidneys will do a lot of things, but one thing they won't do is to produce back-ache. People think that because the kidneys are somewhere in the back, therefore, it must be the kidneys that are at fault if there is a pain there. That popular supersitition is taken advantage of by many patent medicine advertisements, which cry aloud the absolutely false advice, ' If your back aches, have your kidneys attended to.' That fake has taken a tremendous amount of money out of the pockets of the people. If you have back-ache, it may indicate something, but it does not indicate kidney disease."—Dr. H. W. Hill, London, Ontario, Nov. 4, 1915.

That if Copper Wire be Bound Tight round a person's Waist he will not Suffer from Rheumatism

This fallacy hails from Canada. In England the less Spartan treatment advocated is to use a skein of silk in place of the copper wire ! Dr. H. W. Hill dealt with the matter in an address he gave on Nov. 4, 1915, in London, Ontario, and in doing so asked his audience whether, if it were true, the Government were not terribly remiss in that it did not put a piece of copper wire round the waist of every soldier ! " If this is true, then the Government is absolutely wrong, and if it is not true, then those of us who believe the popular idea are absolutely wrong."

That if Red Flannel be Worn round the Neck, the Wearer will not have Sore-Throat or Diphtheria

This idea evidently prevails in Canada as well as in England, for we find Dr. H. W. Hill refuting it in an address he gave in London, Ontario, on Nov. 4, 1915. He aptly inquired whether (if it were true) the Government were not terribly remiss in not putting a piece of red flannel round the neck of every soldier before sending him to the war.

That Dead Bodies Produce Pestilence

"Another very old and widespread tradition is that dead bodies produce pestilence. But it has been reported on by the Pasteur Institute in France, and the French found it necessary to make a Government report to assure its people that pestilence does not come from the dead bodies on the battlefield."—Dr. H. W. Hill, London, Ontario, Nov. 4, 1915.

That Orange Pips and Grape Seeds, if Swallowed, are very likely to Produce Appendicitis

"I have not yet seen one grape seed in an appedicitis case. Most people I know swallow grape seeds. They may get appendicitis, but they won't get it from eating grape seeds."—Dr. H. W. Hill, London, Ontario, Nov. 4, 1915.

"There is little doubt but that the essential cause is *microbic infection*, and it is most probable that the *Bacillus coli communis* is the organism that, in the majority of cases, brings about the disease. . . . among other conditions existing in the canal which are to be regarded as predisposing causes is the presence in the appendix of foreign bodies which are only very occasionally derived from the ingesta—such as stones of fruit—but which far more commonly consist of fæcal concretions having for a nucleus masses of bacteria, and often simulating vegetable seeds in their appearance."—Dr. W. H. Allchin, F.R.C.P., and Sir Frederick Treves, F.R.C.S., in Quain's *Dictionary of Medicine* (1902).

That the many Deaths in The Black Hole of Calcutta were due to the Poisonous effects of the Carbonic Acid Gas in the Breath of those in the Hole

On March 19, 1919, Prof. Hill read a paper to the Royal Meteorological Soc. on Atmospheric conditions which affect health in which he stated that "in the past, much has been made of the chemical alteration of the air in crowded places, and unsound views have become popular. The victims of the Black Hole of Calcutta died from heat-stroke, not from a poisonous vitiation of the air by the exhalations of the crowd."

A school-boy's essay on the "Black Hole of Calcutta":—"An abominable Indian tyrant put 146 men into a small room

with one little widow [window]. Next morning only 23 of the men were alive ! "

That Powdered Glass can be used, unknown to the Victim, as an Effective Poison

This supposed form of poisoning is usually associated with the East, where the powder is said to be put in the coffee of the intended victim. If the glass were only coarsely powdered then the victim would certainly notice the glass in his food or drink ; otherwise, coarsely powdered glass would certainly be liable to cause mechanical injury—which is not poisoning—to the alimentary camal. But the powdered glass is always said to be very fine, and it obviously would have to be so for it not to be noticed by the person for whom it was intended.

At. p. 59, Vol. I. of Beckmann's *History of Inventions*, we find, " At Paris it was once believed that succession powder [what charming linguistic camouflage !—ED.] consisted of diamond dust pounded exceedingly fine. Without assenting to this idea, one may contradict Voltaire, who conceives that diamond dust is not more prejudicial than powder of coral. It may be rather compared to that fine sand which is rubbed off from our mill-stones, and which we should consider and guard against as a secret poison, were we not highly negligent and careless of our health in the use of food." To this there is the following footnote of two paragraphs, the first by Beckmann, and the second apparently by the learned revisers of the Fourth Edition (1846), W. Francis, Ph.D., F.L.S., and J. W. Griffith, M.D., F.L.S.

" In one year a ton of sand [from which glass is made.—Ed.], at least, which is baked with the flour, is rubbed off from a pair of mill-stones. If a mill grinds only 4,385 bushels annually, and one allows no more than twelve bushels to one man, a person swallows in a year above six pounds, and in a month, half-a-pound of pulverised sand stone, which, in the course of a long life, will amount to upwards of three-hundred weight. Is not this sufficient to make governments more attentive to this circumstance ? "

"[Although not very agreeable to the reader to learn that he swallows above six pounds of mill-stone powder in the course of the year, it may perhaps ease his mind to know that the learned author is entirely mistaken in regarding it as a poison. The inhabitants of the northern countries of

Europe frequently mix quartz powder with their heavy food to assist in its digestion ; and we are informed by Prof. Ehrenberg, that in times of scarcity, the inhabitants of Lapland mix the siliceous shells of some species of fossil Infusoria with the ground bark of trees for food.] "

Powdered glass in Avicenna's time (*c.* 1000 A.D.) was far from being considered a poison, for it " was high esteemed internally as a remedy in calculi and externally in nebulæ of the cornea."—From *Medicine in the Middle Ages*, an address by Mr. Henry Power, F.R.C.S., to the Abernethian Society, July 8, 1886.

" Powdered Glass.

" This was long believed to act as a poison, and was even known as ' succession powder ' ; over a hundred years ago experiments in varied form were made showing that it is harmless. Details are given in Dr. Cabanés's ' Les Curiosités de la Médecine,' pp. 146-8. The belief lingers in the Orient ; for instance, ' powders ' of finely pounded glass were in evidence at a murder trial in Agra reported in *The Times*, Dec. 19, 1912, p. 5.

" Boston, Mass. Rockingham."

Notes and Queries, Apr. 22, 1916, p. 335.

On Dec. 31, 1915, Mr. Philip Parker, B.A., M.I.C.E., told the author that the Resident at Baroda, India (Sir John Kirk) was ' poisoned ' by powdered diamonds and that the case is recorded in the life of Cockburn who received £30,000 for defending the prisoner. Cockburn afterwards became a Judge in India. The author has not verified these particulars.

" Powdered Glass.

" A poisoner testified in New York City, in the spring of 1916, that he first tried ground glass ; finely powdered glass, however, is harmless (see ' The Traumatic Causation of Appendicitis,' by S. G. Shattock, in the *Proceedings* of the Royal Society of Medicine, London, 1915-16, ix., Pathological Section, at pp. 26-7, July, 1916), confirming the experiments of about a century ago, cited at 12 S. i. 335. This conclusion has a present and popular interest, in that it shows the needlessness of the fear of enamelled ware for the kitchen, and of stone-ground flour. These last have been held to be causes of appendicitis, a disease of which the folk-lore should be written. The especial advantage of such a research is that its *terminus a quo* can be accurately placed and dated,

the vogue of appendicitis starting with a publication by a Boston man in 1886. Since then there has grown up a mass of popular 'knowledge' which contrasts sharply with that of the surgeons most experienced therein; for instance, see preface to 'Appendicitis,' by T. W. Harmer, in *The Boston Medical and Surgical Journal*, Feb. 1, 1917, clxxvi. 165-70: 'the greater the experience, the larger the perplexities and mistakes.'

"Boston, Mass. ROCKINGHAM."

Notes and Queries, Mar. 24, 1917, 239.

Sir Thomas Browne dealt with this fallacy in Book II., Chap. V., Sec. 2, of his *Vulgar Errors*, wherein he said, "That glass is poison, according unto common conceit, I know not how to grant. Not only from the innocency of its ingredients, that is, fine sand, and the ashes of glass-wort or fern, which in themselves are harmless and useful, or because I find it by many commended for the stone, but also from experience, as having given unto dogs above a dram thereof, subtilely powdered in butter and paste, without any visible disturbance."

John Phin also dealt with it in his *Seven Follies of Science*, 1911, p. 211, wherein he says, "Even within two or three years a man was charged with committing murder by means of powdered glass and was tried for a capital offence. Of course the physicians who went on the witness stand scouted the idea of powdered glass acting as a virulent poison and one of them offered to swallow a tablespoonful of the stuff in open court. . . .

"The idea that powdered glass is an efficient poison for rats and mice is quite prevalent, but it has been proved by recent experiments made under the direction of the United States Dept. of Agriculture that glass, whether coarsely or finely powdered, has no ill effects upon rats. Rats were fed for some time on food mixed with the glass and they did not seem to be injured by it. And when examined after being killed, the alimentary canal was found to be in normal condition. So that we may safely relegate the belief in powdered glass as a poison to the list of popular fallacies."

In the Ilford murder case which was fully reported in the press during Oct., Nov. and Dec., 1922, it was pretty obvious, though perhaps not proved, that Mrs. Thompson had tried to kill her husband by administering powdered

glass to him—she said in her letters that she tried this. But it failed.

Vide Lyon's *Medical Jurisprudence*, and *Life of Benvenuto Cellini*, p. 263.

That Infantile Paralysis is Usually Caused by a Fall

The *Daily Mail* of Aug. 14, 1916, in reporting the death of Mrs. Frank E. Page, the daughter-in-law of Dr. Page, the United States Ambassador in London, stated that their medical correspondent had said "Infantile paralysis, medically called anterior poliomyelitis, is chiefly a disease of children under three years of age, but sometimes it attacks adults, though it is extremely rare in people over twenty-five. The popular belief used to be that the nurse let the child fall, hurting its spine; the real cause is a germ, which produces at first an acute fever and in a day or two extensive paralysis. Most of the paralysed muscles recover, but some remain paralysed, contract, and cause deformities."

At p. 1163 of Quain's *Dictionary of Medicine*, 1902, we read, ". . . Season has a marked influence; three-quarters of the cases occur during the hottest third of the year. It often follows exposure to cold, as an unaccustomed cold bath in hot weather, or exposure to a draught when heated. . . . It occasionally succeeds a fall at an interval of a few days. Over exertion probably predisposes to it; in children this cause can often be traced."

Notice that the effect of the fall, if any, is quick, whereas one has often heard of illness in an adult being ascribed to "a fall when a baby."

That the great modern Advances in the Science and Practice of Medicine are for the most part due to Medical Men

The author had the pleasure of listening to a lecture by Prof. W. Bulloch, M.D., F.R.S., of the London Hospital, to the Hospital Officers' Assoc., on Jan. 18, 1918, in which he dealt with the above matter in no uncertain manner. He made it clear that the research work, discovery, and experimental work are and have been done by bacteriologists, pathologists, botanists, anatomists, physiologists, and physicists working in laboratories, and that the resulting advances were *not* made at the bedside, and not by medical men. Salvarsan or '606,' diphtheria serum, Röntgen rays, anti-

typhoid inoculation, and investigations on breathing at high altitudes were not the work of practising medical men. Prof. Bulloch stated emphatically that nothing was done in War diseases by consultants, either physicians or surgeons. Even the diagnosis of diseases is done mainly by pathologists.

That most varieties of Bacteria are Killed by being Frozen

" It is, of course, common knowledge that meat, milk, &c., ' go bad ' much more rapidly in Summer than in Winter, ' keep ' best if kept cool, and indefinitely if frozen. Such freezing, however, does not kill the majority of bacteria, but only ' inhibits ' or prevents their activities. Even prolonged exposure to temperatures far below 0° C. (32° F.) has little effect on their vitality."—Dr. W. E. Carnegie Dickson, M.D., B.Sc., F.R.C.P.Edin., p. 37 *Bacteriology*.

At p. 65 *ibid.* we find in reference to the bacillus of plague, " It is very resistant to cold, and is not killed by prolonged freezing, but it is easily killed by heat and antiseptics."

That the Term " Brain Fever " has one Definite and Specific Meaning

The term brain fever is used as if it were a definite disease in the same manner as scarlet fever is used, but Quain's *Dictionary of Medicine* (1902), says, " BRAIN FEVER. A name popularly applied to any kind of febrile state in which symptoms of cerebral excitement are prominent ; as well as to cases of inflammatory disease of the brain or its membranes."

That if your Feet are Wet and you have to keep your Boots on, it is a good thing to pour Whisky into your Boots

When neat whisky is drunk it causes a *sensation* of warmth, but there is no actual rise of temperature. On the contrary, the whisky is at a lower temperature than the mucous membranes into which it comes in contact. It acts as an irritant in the same manner that if pepper or mustard be taken into the mouth they also seem ' hot.' Consequently, it is thought by the thoughtless that the whisky will have a similar effect on the feet and make them warm. Wet boots are bad because water is a better conductor of heat than leather and thus the natural heat of the feet is conducted away by the water. In addition there is some evaporation

of the water, causing a further loss of heat. If the water is salt there is less evaporation and therefore less loss, but whisky contains (or used to do before the war !) about 50 per cent. of alcohol and this evaporates more rapidly than water, so the loss of heat is likely to be greater with whisky in the boots than water, and therefore probably makes matters worse.

Mr. W. A. Dutt wrote saying the fallacy is a common belief in East Anglia.

On asking two medical friends for information they said, " This is a teetotal sentiment evidently. No, don't waste it ! "

That there are such things as " Growing-Pains " *per se*

This belief implies that there is nothing abnormal in a child experiencing " growing-pains," but on questioning Dr. A. Percy Allan, M.D.(Lond.), he wrote, " What are called growing-pains in children are rheumatism. Valvular disease of the heart is a common sequel of rheumatism (acute or sub-acute Rheumatic Fever). Often where heart disease is found in a child there is no history of Rheumatic Fever, but there is a history of ' growing pains.' "

" ' The pains of muscular rheumatism are commonly called in the nursery " growing pains." This is a phrase which has been the cause of a great many hearts being crippled. Mothers and nurses are apt to regard growing pains as something to be expected during growth.

" ' I need hardly say that it is an absolutely wrong idea. Those so-called " growing pains " are, in the great majority of cases, nothing more than the local manifestations of rheumatism in the muscles, and if they are neglected and the child is allowed to go about suffering in this way it may very easily develop into heart trouble.'

" There is no ambiguity about this. They are the words of a great London physician, and every father, mother, and children's nurse in the kingdom should read them."—*Daily Mail*, Aug. 18, 1921.

That the Taking of the Waters, *per se*, of Medicinal Springs is an efficient cure for many complaints

Dr. C. Simmonds in reviewing (at p. 482 of *Nature* of Aug. 21, 1919), *Beverages and their Adulteration*, by Dr. Harvey W. Wiley, said, " Touching on the widespread

faith of ordinary humanity in the virtues of medicinal springs, the author dryly remarks that this faith is ' not so well founded in fact as it is extensive in belief.' At the same time, he indicates the factors producing the undoubted benefits which often result from ' taking the water '—namely, the change of habits, the simpler diet, avoidance of excesses, and so on. These, of course, are active aids in restoring health even when the water itself has no particular therapeutic value, except, perhaps, as a laxative."

That Malaria Occurs only in the East and in the Tropics

" Most people associate malaria with travel in the East or the tropics. It will be news to them that the ' winged fever ' is one of the most venerable of English diseases.

" Sir James Cantlie, the eminent authority on tropical diseases, whose opinion was sought by a *Daily Chronicle* representative, said :—

" ' The history of malaria in England goes back some hundreds of years. One hundred years or more ago it was just as common as anywhere. Two hundred years ago it was prevalent in this country from John o' Groats to Land's End, and it was then common along the banks of the Thames, in the Fens, and elsewhere.'

" Sir James was asked to indicate the remedy. ' Cultivation and drainage,' was the answer. ' Look at Panama, the healthiest place in the world to day.

" ' Drain Africa, and you get rid of malaria in Africa.'

" Sir James Cantlie had good news for fever patients. It is only very seldom indeed that the malady proves fatal if treated promptly. The worst that it does as a rule is to disable."—*Pall Mall Gazette*, Aug. 21, 1919.

That, *Ceteris Paribus*, Cancer is more prevalent among Females than Males

In a review of *The Health of the Industrial Worker*, by Prof. E. L. Collis and Dr. Major Greenwood, *Nature* of May 19, 1921, p. 354, states, " Evidence is adduced that the prevalence of cancer is connected with industrial conditions, and that, *ceteris paribus*, its frequency is greater in cities and among males."

That Cigarette Smoking is Especially Pernicious

" There is a prevalent belief that cigarette smoking is more injurious to the smoker than the smoking of pipes, and

it is usually alleged that the belief must be true because ' doctors have said it.' I have never, myself, met a doctor who would commit himself to this opinion, . . . it cannot be determined without a very long and wide course of experimentation, or a still longer and wider course of observation directed especially to the point in question, such as has certainly never been undertaken."—Dr. Chas. A. Mercier, M.D., F.R.C.P., F.R.C.S., at p. 67 of his *Spiritualism and Sir Oliver Lodge* (1917).

" There is a widespread belief among smokers that cigarettes are especially harmful because of deleterious substances in the papers.

" To ascertain whether there is any foundation for this fear *The Daily Mail* submitted the papers of several of the most popular kinds of cigarettes and the papers sold in packets for analysis to Messrs. Lewis, Jameson & Co., analytical experts, 83, Queen Victoria Street, E.C.

" The report states that all the papers, consisting of rag cellulose, mainly cotton, are of good quality. " They are free from injurious acidity, the Congo Red Test (for hydrochloric acid) giving negative results. Chlorine, which might possibly be retained from the bleaching process, is absent. A certain amount of saltpetre was detected in the papers covering the cigarettes, but that may have come from the tobacco, being commonly added to make it burn freely.

" ' We were unable to detect the presence of any poisonous or harmful constituents, and we are of the opinion that the papers are all perfectly innocuous and harmless and well adapted for their required purpose.'

" Inquest on Heavy Smoker.

" At a City inquest recently it was stated that a man died from poisoning by carbon monoxide given off by the paper of the cigarettes which he smoked in large number.

" ' In a talk with me,' writes a medical correspondent, ' Dr. Francis Allen, of St. Bartholomew's Hospital, who gave evidence at the inquest, said that it was quite incorrect to state that the man died from cigarette smoking. Old-standing heart disease accounted for his death ; the smoking was a very small factor indeed.' "—*Daily Mail*, Jan. 11, 1922.

" ' Effect of Tobacco on Men ' (W. J. Gies and others in *The New York Medical Journal*, June 1, 1921, 809-811) is

the latest article noticed, and it seems to conclude that moderate smoking is not harmful to most adults, and is helpful to some, and that the least harmful method of smoking tobacco is in cigarettes. The question here, however, is so worded that the answers are likely to be misleading, since 'inhaling' is expressly excluded. No smoker myself, I have no doubt that inhaling smoke from cigarettes is injurious, not because it is from tobacco, but because it is from combustion with an insufficient supply of oxygen. Cigar smoke is too acrid to take way down into the lungs, but cigarette smoke can thus be inhaled; it, in the depths of the lungs, comes into actual physical contact with the minutely divided blood, with result to be paralled in a test-tube by shaking therein blood in contact with carbonic monoxide; thereupon the chemical constitution of the blood is said to be visibly changed, whatever the source of the poisonous gas. This experiment I have not tried and this explanation I have never seen in print, but I believe them both to be true.

"Boston, Mass. ROCKINGHAM."

Notes and Queries, Aug. 20, 1921, p. 159.

"That the gas manufactured by the South Metropolitan Gas Co. contains no more carbonic oxide than the smoke of an average cigar was found by Prof. H. E. Armstrong in some interesting experiments carried out on tobacco smoke, an account of which has been given in the *British Medical Journal*.

"Prof. Armstrong's experiments were carried out with a scientific pipe to which human lips were not applied. A gas sampling bottle was used filled with mercury, which was replaced by puffs of smoke from the pipe. Samples of smoke from cigarettes and cigars were also analysed. Between 60 and 87 parts in ten thousand of carbonic oxide were found in cigarette smoke, and 70 to 114 parts in pipe smoke. Both carbonic acid gas and the poisonous gas carbon monoxide were found in the smoke."—*Daily Mail* (Contl. ed.), Aug. 8, 1922.

A boy asked us if we had any cigarette cards. "What do you do with them?" we inquired. "I collect them." "What do you collect them for?" "When you get a 1,000 you can sell them." "To whom do you sell them?" "I don't know; I have not sold any yet." "How many have you collected?" "NONE"!!

That "D.T.'s" (Delirium Tremens) affects only those who become Actually Drunk

Mr. C. E. Wallis, M.R.C.S., says that a person does not get "D.T.s" without being a heavy drinker, but it is not necessary for him to drink until he is drunk. Dr. A Percy Allan, M.D., wrote on May 11, 1920, "D.T. is due only to alcoholic poisoning. They may occur in 'soakers' who are not obviously drunk."

That the Harmfulness of Inhaling Dust Particles is Directly Proportional to their Hardness and Sharpness

"Experimental Silicosis of the Lungs.

"It is well known that the inhalation of dust particles in various industries may be provocative of serious fibrotic and other changes in the lungs. This obtains particularly among grinders, file-makers, and clay workers, while other dusts, notably coal dust, are much less harmful. The miners on the Rand suffer much from silicosis, due to the inhalation of silica particles derived from the quartz, and A. Mavrogordato has investigated the question experimentally by causing guinea-pigs to breathe dust-laden air of various kinds over varying periods (Publications of the S. African Institute for Medical Research, No. XV., 192). He finds that the solubility and chemical activity of dust, *e.g.* silica, are the important factors inducing fibrotic changes in the lungs, hardness and sharpness of the particles being of little importance. The majority of the particles entering the lungs are less than 1μ in diameter. The particles do not penetrate the tissues, but the tissues take up the particles by means of phagocytic cells. The silica-laden cells block lymphatics and thus prejudice the lungs' ability to deal with infections, and hence secondary tuberculous infection is common."—*Nature*, Sept. 9, 1922, p. 366.

Note.—1μ is one micron, *i.e.*, one thousandth of a millimetre, equal to 1/25,000 inch.

That the Insane usually have a Mad Glare in their Eyes, or Look of Cunning, or Ferocity

"To those who have lived all their lives among the mad, mad people look much as other people, but the stranger, the visitor, always finds a mad glare in the eyes of the insane, or a look of cunning, or of ferocity, as the case may be. He

has been told it is there, and he expects to find it, though it is not there and never was there."—Dr. Charles A. Mercier, M.D., F.R.C.P., F.R.C.S., *Spiritualism and Sir Oliver Lodge*, p. 29.

That Insanity is Disorder of Mind, and Disorder of Mind is Insanity

" For nearly as long, authority has said that insanity is disorder of mind, and disorder of mind is insanity. In vain I have pointed out that there are many disorders of mind that are not insane, and that there is much insanity besides disorder of mind. Reason, observation, experience, the plain evidence of the senses, are powerless against authority." —Dr. Charles A. Mercier, M.D., F.R.C.P., F.R.C.S., *Spiritualism and Sir Oliver Lodge*, p. 128.

" Mental disorder and insanity are popularly regarded as the same thing. This is not so. Insanity = Mental disorder + derangement of conduct."—R. H. Cole, M.D., F.R.C.P.

That if a Person Sleep in Moonlight he will very likely become Blind, or have his Face permanently Distorted, or Become Insane

And that it Makes Meat " Go Bad "

[Pliny in his *Natural History* is responsible for the last.]

" The Sun shall not strike thee by day nor the Moon by night."—Psalms 121, v. 6.

" O blessed breeding sun, draw from the earth
Rotten humidity : below thy sister's orb
Infect the air "

Timon of Athens, IV., iii., 2.

The matter collected on this subject is unfortunately far too voluminous to print. There is a considerable conflict of evidence, but I think it may be truthfully said that support of the popular ideas comes from unscientific, though educated, sources. Prof. C. V. Boys, F.R.S., does not believe Moonlight *per se* can be the cause of the blindness, and if it exists, suggests that it may be due to the radiation of heat (as the radiation is great on a clear moonlight night) and exposure ; nor can it in his opinion be due to the heat of the Moonlight, for that is equal to that received from a candle flame at a distance of 20 feet !

The " Sundowners" and " Beachcombers " of Australia regularly sleep in Moonlight, and in the Great European War many soldiers slept in Moonlight without evil effect.

"SLEEP AND THE MOON (12 S. xi. 311, 355, 397, 437, 494).

"The following may be useful as a practical contribution to this subject. I have often slept in the full rays of the moon, whether in camp or in a room, and never experienced any ill effect; but when shooting in Africa on the borders of the Kalahari Desert 46 years ago, I determined to put the matter to a thorough test. I accordingly had my mattress put in full moonlight on every possible occasion. I also had one half of any game—springbok or whatever it might be—hung on the moonlit side of the wagon, and the other in the shade. This was done on many occasions. I neither suffered myself, nor was any difference perceptible in the meat.

"I am quite convinced that the opinion of most medical authorities competent to judge would be that it is not the moonbeams that produce the ill effects—the facial or other paralyses, etc.,—but the *exposure*, and it is the chill following on profuse perspiration, the dew, a draught, or the damp deck, that are responsible.

"F. H. H. GUILLEMARD, M.D."

Notes and Queries, Jan. 13, 1923, p. 34.

Vide the remarks of Dr. R. H. Cole, M.D., F.R.C.P., *sub* "Lunatics and the Moon."

And "Lunar Periodicity in Reproduction," by H. Munro Fox, at pp. 237-8, *Nature*, Feb. 23, 1922.

That there is No Danger in being Wetted by Sea-Water

"Getting wet in itself does not hurt one, but the exposure lowers the resisting powers and lets the germs fall on 'good ground.' Salt water wetting and not getting dry so quickly would probably be worse than fresh."—Dr. A. Percy Allan, M.D.(Lond.), Sept. 20, 1919.

"There is no evidence whatever that prolonged immersion or wetting in sea-water is less injurious than the same in fresh water."—C. E. Wallis, M.R.C.S., Sept., 1919.

That the Drinking of Sea-Water by very Thirsty People causes them to go Mad

Dr. R. H. Cole, M.D.(Lond.), F.R.C.P., the alienist, writing on Oct. 9, 1919, said, "People go mad from starvation and thirst, and shipwrecked people drinking sea-water aggravate their thirst and so the idea you mention has probably arisen."

That it is More Dangerous for an Adult than a Child to have Whooping Cough

" A Physician," writing on ' Grown-up Whooping cough ' (think it out !) in the *Daily Mail*, May 29, 1923, said, " Less than 5 per cent. of cases terminate fatally. While this is the mortality figure for all ages, whooping cough is, contrary to popular opinion, much less dangerous to adults than it is to children. Less than 1 per cent. of cases of adult whooping cough succumb. The distressing cough, which apparently causes more suffering in adults than it does in children, has not the same power of undermining the vitality of the developed body as it has of sapping that of the immature."

That Wireless Telephony is a Cure for Deafness

This is an illustration of how popular fallacies keep up with the advances of science ! And so do human parasites, for already some are professing to cure deafness by this means.

" Wireless and the Deaf.

" From Lord Charnwood.

" Sir,—When a scientific development receives more than the usual amount of public attention it is immediately invested with a fictitious reputation. At the present time extravagant assertions are being made that ' wireless ' is capable not only of relieving but in some cases of actually curing deafness.

" Cases of so-called miraculous cures have even been reported, and as a consequence parents of deaf children and hard-of-hearing persons have become inspired with an optimism that is doomed to disappointment.

" It is our wish to warn all friends of the deaf, as well as the deaf themselves, that there are at present no indications that ' wireless ' is likely to be a cure for real deafness. It has yet to be proved that permanent improvement attends the systematic use of ' wireless ' in hard-of-hearing cases.

" Experience of the deaf with the telephone—and with some of us this is wide—shows that few deaf persons have been improved by the habitual use of telephone aids, though temporary effects result from the relief of the continued strain of listening.

" Until systematic experiments have been conducted, and trustworthy evidence is forthcoming that certain types

of deafness can be alleviated by ' wireless,' the recent reports of cures must be disregarded.

" The need for investigation is obvious.

" Charnwood, President,
National College of Teachers of the Deaf.
G. Sibley Haycock, F.E.I.S., L.C.P.
Richard Lake, F.R.C.S.
William Milligan, M.D.
Macleod Yearsley, F.R.C.S.
A. J. Story, F.E.I.S."

Daily Mail, May 22, 1923.

" Popular Fetishes.

" Every practitioner is familiar with the multitude of popular superstitions that are to be encountered among the poorer classes in this country. From time to time some sympathetic soul writes a paper on these interesting fads and fancies, and the subject, indeed, is one that admits of closer study and attention than most of us can give to it. The latest contribution to the literature is Dr. Eleanor Lowry's address to the Birmingham Branch of the National Union of Women Workers. Dr. Lowry is medical inspector of schools at Wimbledon, and her experinences have shown her that not the least of the forces that work against her is popular superstition. Thirty per cent. of the children she inspected wear necklaces of blue beads or cheap coral as prophylactics against common colds and quinseys. She found boys with the dirty string necklace common enough, and worn for the same reason, and in one case she records a new treatment, popularly said to be highly efficacious, for running ears. This consists in poulticing the affected ear with a quid of chewing tobacco—and trusting to luck. The practice of piercing the ears to improve the eyesight is one with which most doctors have had a tilt, and there is little doubt that the average slum child is brought up to believe in charms and amulets of a nature that would shock a self-respecting South Sea Islander. Medical folk lore is an enthralling subject for discussion and speculation, and we commend it to the general practitioner who has the time or the inclination to compile a paper, somewhat on the same lines as Dr. Lowry's, dealing with these popular fetishes. Ignorance and apathy are the two great giants which all doctors have to fight

against in their struggle to inculcate into their poorer patients the ordinary essentials of hygiene. Such compilations as we suggest will enable those of us who are waging that struggle to understand the motives and underlying causes of many of these popular superstitions and practices, and therefore to be in a position to cope with them more effectually."—p. 351, *The Hospital*, Dec. 25, 1909.

"Queer 'Remedies'

"Two amusing stories were told by Mr. E. E. Wild, K.C., at a meeting at the Mansion House yesterday in aid of the Metropolitan Association for nursing the sick poor in their own homes. He was referring to the ignorance and superstition which their nurses met with, and gave the following examples:—

"Hearing loud yells of pain a nurse went into the house from which the noise came, and inside noticed the smell of boiling vinegar. Rushing upstairs she found a stalwart policeman in bed with pneumonia. His wife had concocted a brew of boiling vinegar and linseed and was ladling it straight out of the pot on to his chest. (Laughter.) The pneumonia was cured long before the burns.

"In another case a woman suffered from blood poisoning in the face, and when asked how it happened said she had 'a few words' with a woman who bit her. She went to another woman, who advised her to apply a dead mole to the wound. She could not find a dead mole, so she applied a dead rat."—*Daily Sketch*, Oct. 25, 1912.

"In the present enlightened age, it is amazing to find that such a superstition as was exposed by a N.S.P.C.C. prosecution at Neath (Glamorgan) survives. Mary Pike, married, Queen's Square, Aberdulais, was charged with committing an assault upon Ivy Langstone, 1½.—Mr. A. Jestyn Jeffreys (prosecuting) said defendant had cut the child's ears with a razor. The child was wrongly supposed to be suffering from rickets, and the operation was made to effect a cure. It was, said Mr. Jeffreys, a superstition which prevailed in some places, and the society had taken the proceedings to put a stop to the practice, which was a most dangerous one, and which, of course, had no such result as the superstition claimed. The superstition became all the more harmful because it dictated a repetition of the cutting at certain phases of the moon.—Inspector Best, of the N.S.P.C.C.,

told the Court that defendant, when questioned, replied: 'I did it. I have cured hundreds of children. I don't put any price on, but if they offer anything, I take it.'—Dr. Mudie Morris, medical officer, condemned the practice as a 'relic of a superstition of the very worst character.' It was useless and dangerous, leading to the setting up of septic poisoning, and should be stamped out.—Mr. W. A. Leyson (defending) said his client had acted in the belief that she was doing good, but would give an undertaking not to repeat the practice.—Defendant was ordered to pay the costs.—Elizabeth Langstone, Wilmot Street, mother of the child, for aiding and abetting, was also ordered to pay the costs."—*News of the World*, Oct. 18, 1914.

Two books which all who are interested in medical fallacies and allied matter should read are SECRET REMEDIES. *What they Cost and What they Contain*, 1909, and *More Secret Remedies*, 1912. They were published at 1s. each by the British Medical Association, 429, Strand, W.C., and are based on analyses made for the B.M.A. They give details of most of the well-known patent medicines, and probably no other books of the kind have contained such startling revelations!

There is a page (No. 732 in Vol. I.) in *Chambers's Book of Days* devoted to "Superstitions about Diseases."

The following references will be useful:—

Golden Rules of Social Philosophy [refuting many popular superstitions]. By Sir Richard Phillips (1826).

The Psychology of Error. By Hugh Elliott in the "Edinburgh Review," July, 1921, pp. 39-57.

Observations on Mental Education; a lecture by Prof. Faraday, LL.D., F.R.S., to the Royal Inst. Re-published in *Science and Education* (Heinemann, 1917).

Memoirs of Extraordinary Popular Delusions. By Chas. MacKay, LL.D. (1852).

An article on medical superstitions by F. H. Pickin, M.R.C.S., L.R.C.P., in *The Practitioner*, Dec., 1909.

Popular Superstitions. By Francis Grose, F.R.S. (1811).

FALLACIES CONNECTED WITH THE ANIMAL KINGDOM.

"The works of Pliny, that great reservoir of lies about animals."—C. J. Cornish, *Animals at Work and Play*, p. 299.

(a) MAMMALS

That a Mad Dog avoids Water, and that More Dogs go Mad in the so-called "Dog Days" than during any other Period

ACCORDING to Mr. John Timbs, F.S.A., a mad dog will both drink and swim in water as usual, and Dr. J. R. Bradford, D.Sc., M.D., F.R.C.P., F.R.S. (Art. "Rabies," Quain's *Dictionary of Medicine*), does not say a word which implies that a mad dog dislikes water, or that there is any particular period in the year when rabies is most common. On the other hand, he gives, as the most characteristic clinical feature (in the case of the "furious" form of the disease), the high-pitched and falsetto bark. He also says that the term "hydrophobia" (meaning "fear of water") is not correct, for there is *not* necessarily any fear of water during the height of the disease in man, but only great difficulty in swallowing liquids, and it is in attempting to swallow that attacks of convulsions are brought on, while in some cases the mere sight of water will bring on the convulsions. The term "hydrophobia" is usually limited to cases of the disease in man, and "rabies" to the same disease in animals. There appears to be a double fallacy as regards "dog days"; first that dogs go mad more particularly during that period, and secondly that the term "dog days" arose from this supposed fact. The term has nothing to do with the animal we call a dog. The period is so named after the dog-star, for it was considered by the ancients as far back as 450 B.C. that when the dog-star and the sun rose together, then the temperature was greatest owing to their combined effects.

Partly, no doubt, because the period when the dog-star and sun join forces has gradually changed during so many centuries, there has been some diversity of opinion as to the exact period called the "dog days," but it is now usually agreed to be from July 3 to August 11, inclusive.

Sir Thomas Browne, M.D., devoted Chap. 13 (the last of the last Book) of Book IV. of his *Vulgar Errors* to the subject *Of the Canicular or Dog-days.*

That Whale-bone is True Bone, and that it is Found in all Whales

Its correct name is baleen (Lat. *balæna,* a whale). It has scarcely any of the properties of bone; its composition is different, and it is of different morphological origin. It is found attached to the upper jaw, and serves to strain the water which the whale takes into its mouth, and to retain the small animals (for a whale-bone whale's gullet is comparatively small) on which it subsists. It is not all whales which are furnished with this appendage. It is more particularly found in the common Greenland whale (*Balæna Mysticetus*), the Antarctic or black whale, and the American whale. These animals (for the whale is not a fish) have no teeth, and their place in the upper jaw is supplied by rows of flat plates, the inside edges of which are furnished with a fringe of bristles; these flat plates are the baleen or whale-bone. There are two rows of these plates, one on each side of the upper jaw, so that they hang down on each side of the tongue, and when the mouth is closed the free ends of the plates are directed backwards—that is, towards the gullet.

"Each of these rows consists of about 300 [Prof. W. H. Fowler, C.B., says even 380.—Ed.] of these plates of baleen. There are some of these plates 12 ft. in length in South Kensington Museum, but the average length of the middle ones is about 8 ft. or 10 ft. The average weight of these plates is about 7 lb., so that a whale carried in his head nearly two tons of whale-bone."—Dr. E. Lankester, F.R.S.

That a Cat sees better in the Dark than in the Light

In the natural state a cat's prey comes out at twilight; hence the cat hunts then, and this gives rise to the idea that it sees better in the dark. The iris of the cat's eye is capable of great variation, so as to admit less or more light; thus, on a bright summer's day the pupil (*i.e.,* the aperture in the iris) is a mere vertical slit, but in the dusk it opens enormously, till there is scarcely any of the iris left visible, and this adaptability no doubt enables the cat to see much better *in the dusk* than we can, for our eyes possess this power of altering the size of the pupil to a much less degree, and the

eyes of the cat, being sensitive to the ultra-violet rays of the spectrum, would also enable it to see better in the dusk than we can. Then, again, cats are provided with those very sensitive tactile organs, the long hairs on each side of the upper lip, and these are of great assistance to them when moving about in the so-called "dark," but in absolute darkness all animals are equally helpless as regards their sense of sight, though some may have special organs connected with one of the other senses (as the "feelers" of the cat, and antennæ of insects), which enable them to be far better off in the dark than others.

Another feature which adapts certain eyes for use with only a poor light is the constitution of the retina which is composed of two sets of structures, the so called rods and cones, the latter being concerned in the sensation of colour. The rods apparently are affected by radiation slightly before the cones, hence animals (*e.g.*, owls) whose eyes possess a large proportion of rods are better suited for seeing in a faint light. H. R. Allport, *Casual Club Papers*, Series I., speaking of Byron's marriage, "Some at least of his assailants remind one of the famous definition of the lynx—'an animal so sharp-sighted that it is able, even in the thickest darkness, to perceive objects which have no existence.'"

It has been said that cats can see in the dark because they eat 'lights!'

That Rats never go on a Ship that is about to Start on the Voyage on which she Founders

"A rotten carcase of a butt, not rigged,
Nor tackle, sail, nor mast; the very rats
Instinctively have quit it:"

The Tempest, I., ii., 146.

No doubt, formerly, the Board of Trade and Lloyd's were not so careful as they are now about the sea-worthiness of a vessel before allowing her to proceed on her journey. Indeed, this fallacy probably arose long before either of the above institutions was in existence, and a ship with a number of small leaks would probably have a large quantity of bilge water, which would flood the rats' headquarters and make them so generally uncomfortable that they would leave for fresh ships and bilges drier! Hence we see the popular idea is founded on fact; but that the rats *never* make an error of judgment, and hence that no rat ever loses its life by the foundering of a ship, we utterly refuse to believe,

for many vessels are lost, which are perfectly sound as they leave port, through bad navigation, storms, etc.

Then as to the sea-worthiness: in these days, at least, men's judgment on such matters must be superior to that of rats, and consequently if the vessel were in such a bad state that even the rats noticed it, the inspectors would too, and hence they would not allow her to proceed.

It is sad to find Bacon lending his support to this fallacy, for in his *Essay*, "Of Wisdom for a Man's Self," he says, "It is the wisdom of rats, that will be sure to leave a house somewhat before it fall."

The following paragraph appeared in *Pearson's Weekly* for October 9, 1897:—

"How do Birds foretell Death?

"Most sailors believe that 'rats desert a sinking ship,' that is, refuse to go upon the last voyage which a vessel makes. Sailors suppose that the rats know instinctively when a disaster is about to occur, and they are induced with great difficulty to ship upon a vessel that has no rats aboard.

"A curious story comes from Hamburg to the effect that, a few days before the cholera epidemic broke out some two or three years ago, all the birds took flight from the city. It was then recalled that in 1884, when the cholera was raging in Marseilles and Toulon, all the birds deserted those cities, and took refuge in Hyères, which remained entirely free from cholera during the whole summer.

"In the summer of 1872 all the sparrows in Przemysl, a town of Galicia, suddenly departed two days before the appearance of the pest, and not a bird returned until the end of November, when the cholera had disappeared.

"'A little bird told me' is a common expression, but the important question seems to be, 'Who told the birds?'"

That a Whale is a Fish, and that it Spouts Water through its Nostrils

"Although the home of the *Cetaceæ* (to which class of animals whales belong) be entirely in the waters, they have several features in common with the larger quadrupeds. They belong to the Linnean class of Mammalia, or suck-giving animals; they produce their young alive; their skin is smooth, and without scales; their blood warm, and the flesh tastes somewhat like coarse beef. They have lungs by

means of which they respire, and, being unable to separate the air from the water, as fishes do by means of their gills, they must come to the surface in order to breathe.

"In representations of the whale, we generally see two spouts of water mounting into the air from his nostrils, when he is above water, like artificial fountains. These are occasioned merely by the mode in which the animal breathes; and it is an error to suppose that he ejects the water through the nostrils. It is, on the contrary, the breath which is thus discharged, mixed with mucous matter, and perhaps the foam of a wave which may happen to dash over the nostrils while the whale is exhaling. When this vehement breathing or blowing is performed *under the surface*, much water is thrown up into the air."—J. Timbs, F.S.A., *Popular Errors*.

Sir W. H. Fowler, F.R.S., in *Ency. Brit.*, 10th ed., says on this subject: "Of the numerous erroneous ideas connected with natural history, few are so widely spread and so firmly believed, notwithstanding repeated expositions of its falsity, as that the *Cetacea* (the whale group) spout out through their blow-holes water taken in at the mouth. The fact is, the 'spouting,' or more properly the 'blowing,' of the whale is nothing more than the ordinary act of expiration, which, taking place at longer intervals than is the case with inland animals, is performed with a greater amount of emphasis. The moment the animal rises to the surface it forcibly expels from its lungs the air taken in at the last inspiration, which, of course, is highly charged with watery vapour in consequence of the natural respiratory changes. This, rapidly condensing in the cold atmosphere in which the phenomenon is generally observed, forms the column of steam, or spray, which has been erroneously taken for water. It also often happens, especially when the surface of the ocean is agitated into waves, that the animal commences its expiratory puff before the orifice has quite cleared the top of the water, some of which may thus be driven upwards with the blast, tending to complete the illusion."

Dr. E. Lankester, M.D., F.R.S., gives the same explanation, but it is remarkable that Darwin, though he refers to the spouting of whales, does not caution his readers about the usual mistake made in this connection.

Mr. Frank T. Bullen strongly supports the statement that whales do not spout water out of tops of their heads. He deals with this matter fully at pp. 188-9 of his *Cruise of*

the "Cachalot," which is so wonderfully written that while reading it one can almost feel the motion of the boat and wind, and sniff the salt fresh sea air !

The illustration opposite p. 57 of *Mammalia*, by Louis Figuier, is of a whale blowing *water*, though at p. 32 the text is correct.

When attending Herbert J. Ponting's delightful kinematograph lecture 'With Capt. Scott in the Antarctic,' on Dec. 2, 1916, the author heard him point out the fallacy and say that the 'blow' is so strong that on one occasion it nearly blew him off the ice ! He showed a film of the Killer whales blowing. The whole of his films are intensely interesting and instructive, and many very beautiful, showing to what good and entertaining purpose the kinematograph can be put, and making one more disgusted than ever with the shocking trash that is shown in *England* (for there is a marked improvement when one goes to Scotland).

That the Hyæna and Zebra are Untamable

"Colonel Sykes has taken some pains to correct the popular error respecting the ferocious and untamable disposition of the hyæna. In India the Colonel possessed a female cub, which was allowed to run about the house. On the voyage home it played with the sailors on board ship ; indeed, it was as playful and good-humoured as a puppy. Subsequently Colonel Sykes placed this hyæna in the gardens of the Zoological Society in Regent's Park, and there, when full-grown, it fondly recognised its master by rubbing itself against his hand."—*Proc. Zool. Soc.*, 1833.

The zebra may occasionally be seen performing in a circus, and several years ago the author saw Lord Walsingham's four-in-hand of zebras being photographed by the Albert Hall, Kensington.

An illustration from a photo was given in the *Daily Mail* of Mar. 16, 1916, showing a German officer, in East Africa, mounted on a Zebra.

That Camels Carry Water in their Humps

"The hump or humps on the camel's back are mere masses of fat, without any corresponding curve of the vertebral column of the animal, and form a reserve of nourishment to be used when other supplies fail ; consequently during lengthened periods of privation, and during the

rutting season, when the males almost cease to eat, these masses greatly diminish in size. In its native deserts, however, the camel is more likely to suffer from lack of water than of food, and accordingly the stomach is so modified as to allow of a certain quantity of water being stored for future use. On the walls of the paunch, or first stomach, little pouches with narrow mouths are developed; these are the so-called "water cells," the biggest of which in an adult camel measures, when dilated, about three inches in width and depth, and these serve to strain off a considerable quantity of water from the contents of the paunch, retaining it for future use by means of powerful sphincter muscles. When crossing a desert the camels are expected to carry their load (which varies from 500 lb. to 1,000 lb., according to the variety of camel employed) 25 miles a day for three days without a drink, getting a supply of water, however, on the fourth; but the fleeter varieties will carry their rider and a bag of water 50 miles a day for five days without drinking. It is of very great service when, the whole caravan being on the point of perishing for want of water, the acute sense of smell which the camel possesses enables it to perceive the presence of water more than a mile off; then it will break its halter and make an unerring track for the well."—J. Gibson, in *Ency. Brit.*

There appears, too, to be a considerable tendency to exaggerate the period for which a camel can go without water. Prof. T. Rymer Jones, F.R.S., says "ten or even twelve days without drinking." Another says "weeks"! Lieut. Burne, *Travels in Bokhara*, says it is a vulgar error to believe that they can live any length of time without water. They generally pine, and die on the fourth day; and, with great heat, will even sink sooner. While Sir C. Rivers Wilson, in speaking of the march to Abu Klea, said that all the camels which had been without water from six to seven days did not survive the treatment, and that to keep them on their legs it was necessary to water them every second day.

That a "Dromedary" is not a Camel

There are two species of camel, the Arabian and the Bactrian. The Arabian (all single-humped) includes several breeds, the chief of these being the thick-built, heavy-footed, slow-paced variety, used for carrying heavy loads, and the dromedary, a name often applied to all members of the

single-humped species, but properly belonging only to a thin, comparatively elegant, and fine-haired breed, celebrated for its fleetness, carrying its rider, when necessary, 100 miles a day. It is the " race-horse " among camels.

The Bactrian is the two-humped camel.

The scientific name of the Arabian species is *Camelus dromedarius;* that of the Bactrian, *Camelus bactrianus.* Hence we see all dromedaries are camels, but all camels are not dromedaries !

From the name *Camelus dromedarius* we see the origin of the two vulgar names, " camel " and " dromedary," and then somehow it has come about that the " dromedary " is thought to be a distinct animal. There is at least one somewhat similar instance in the vegetable kingdom. The common species of camellia is *Camellia Japonica* (the Japan rose), the name of a genus of *Ternstromiaceæ.* Japonica merely indicates the country where the plant is indigenous, but in South Africa the plant is called indifferently a japonica, or a camellia. It is named camellia after George Joseph Camellus, who travelled in Asia and wrote a history of the plants of the island of Luzon.

That when you " Worm " a Dog you cut a Worm out of its Tongue

Worm : to remove the " worm " or lytta from the tongue, as of a dog ; supposed to be a precaution against madness.

" Is she grown mad now ? Is her blood set so high ? I'll have her madded ! I'll have her *worm'd.*"—Fletcher, *Pilgrim* iv. 1.

" The men repaired her ladyship's cracked china, and assisted the laird in his sporting parties, *wormed* his dogs, and cut the ears of his terrior puppies."—Scott.

" Lytta : the long vermiform rod of cartilage or fibrous tissues in the middle line and under the surface of the tongue of a carnivore ; the glosso-hyal of a carnivore ; the so-called ' worm ' of a dog's tongue. It is vulgarly supposed to be a parasite, and is often extracted by dog-fanciers."—*Cent. Dict.*

Ency. Dict. says of the lytta : " This ligament is frequently cut out when the animal is young, for the purpose of checking the disposition to gnaw at everything. The operation was formerly supposed to check rabies or madness."

That Hedgehogs Suck Cows

" Superstitious ignorance, as in the case of the poor little shrew, has led to the cruel persecution of the hedgehog, because, forsooth, it was (and in some places still is) believed to drain dry the udders of cows during the night, to the surprise of the milkmaid and the indignation of the farmer. To the slow-worm and the fern-owl (*Caprimulgus*) the same mischievous habits have been attributed, the physical impossibility of their committing such a theft being overlooked, or not appreciated. With respect to the hedgehog, this accusation, as Mr. Bell observes, is about as well founded as that by Pliny, and exaggerated by Sperling, who asserts that it ascends trees, knocks off apples and pears (Allian says figs), and throwing itself down upon them so that they may stick to its spines, trots off with the prize."—*The Royal Natural History*, edited by James Wylde.

It seems scarcely possible that this should still be believed when nearly 160 years ago it was thought necessary to point it out as a fallacy, as will be seen from the following quotation :—

" This is the case with an animal which gives suck. The teat is close embraced round by the mouth of the young one, so that no air can pass between : a vacuum is made, or the air is exhausted from its throat, by a power in the lungs ; nevertheless, the pressure of the air remains still upon the outside of the dug of the mother, and by these two causes together the milk is forced into the mouth of the young one. But a hedgehog has no such mouth as to be able to contain the teat of a cow ; therefore any vacuum, which is caused in its own throat, cannot be communicated to the milk in the dug. And if he is able to procure no other food, but what he can get by sucking cows in the night, there is likely to be a vacuum in his stomach too ! "—*New Catalogue of Vulgar Errors*, by Stephen Fovargue, A.M., 1767, p. 186.

" Hedgehogs and Cows' Milk.

" A letter from the Board of Agriculture on the hedgehog was read at the meeting of the Ash Parish Council in reply to an inquiry whether hedgehogs take the milk of cows while the latter are lying down. The Board state that the question was referred to their zoological adviser, and that they are informed that the statement is ' unfounded in fact.' "—*Daily Mail*, Nov. 11, 1908.

"Hedgehog Plague.

"Farmers' Complaint of their Milking of Cows.

"A sporting incident on a farm at Uffculme, in Devonshire, has revived the question whether or not hedgehogs under certain circumstances abstract milk from cows. A farmer and his friend were shooting rabbits when their spaniels bustled out of the hedge with a hedgehog in its mouth. 'Kill the brute,' called out the farmer. 'Hedgehogs have been a perfect pest this year. They have been milking my cows.' The dog returned to the hedge, where it caught five other hedgehogs in quick succession.

"A correspondent who made inquiries among Devon farmers was astonished to find how many were convinced that hedgehogs take milk from cows when they are lying down. A gamekeeper said he would not be surprised if hedgehogs like milk. He had known them kill fowls and suck innumerable eggs."—*Daily Mail*, Dec. 18, 1912.

Vide a paper by Mr. Miller Christy, F.L.S., on *The Ancient Legend as to the Hedgehog Carrying Fruits on its Spines* in the "Memoirs and Procs. of the Manchester Lit. and Phil. Soc., Vol. 63, No. 2, for 1918-19.

Also a letter from Mr. Miller Christy at p. 242, *Nature*, Oct. 20, 1921. Gilbert White's *Selborne*, p. 106. Claude Morley's letter at p. 105, *Notes and Queries*, April, 1919, and the author's reply thereto, which appeared at p. 160 of the issue for June, 1919.

That Large Animals Require a Luxuriant Vegetation

Darwin (*Voyage of a Naturalist*) refutes this in no uncertain manner, his words being: "I do not hesitate to say that it is completly false." He goes on to point out that the fallacy has corrupted the reasoning of many geologists. It appears to have arisen in this way: Until comparatively recently India was the only tropical country known to many Englishmen, and out there they came to associate big game with large and rich vegetable growth. In South Africa, however, most of which is arid, and where, consequently, the vegetation is anything but luxuriant, there are large numbers of big animals, and, as another illustration, might be mentioned the American bison (more commonly and in error called a buffalo), which inhabits the prairies and savannahs of North America.

That it Improves the Resulting Cat's Fur to Skin the Cat Alive

Even if it did, the end most certainly does not justify the means, though no doubt many might be found who differ from us, just as there are numbers of people who are so indifferent to the sufferings of young birds that they wear parts of, or whole, birds in their hats. The plumage of birds is best in the nesting season, so the parent birds are slaughtered then, and the young consequently starve in their nests.

Dr. E. Lankester, F.R.S., in the *Uses of Animals to Man*, writes thus: "It is a vulgar impression that if cats are skinned alive their skins are more valuable. Now, I have the authority of both Mr. Roberts and Mr. Nicholay for saying there is not a particle of truth in this belief. They are not only utterly unaware of any difference between the skin of a cat when taken off alive, but they were never acquainted with a furrier, who had thought of such a thing. Yet most assuredly it is a fact that there are wretches who, acting on this impression, have skinned cats alive, and who have been brought before our public courts in consequence."

Cats are bred in Holland for the sake of their fur.

That a Mad Dog Rushes about Foaming at the Mouth

In the two and a half page article by Dr. John Rose Bradford, F.R.C.P., F.R.S., in Quain's *Dictionary of Medicine*, on rabies, there is not a word about a dog, or any animal, suffering from rabies, *foaming* at the mouth, though the symptoms are minutely described. Dr. Bradford says that in the last stages of the disease, when the animal is so paralysed that it *cannot stand*, much less rush about, the jaw drops, and considerable quantities of *stringy* or *ropy* saliva hang from it. One of the most characteristic symptoms is that the bark becomes exceedingly high-pitched.

The Muzzling Order of 1897 greatly reduced the disease, and in 1899 no human being died of hydrophobia in England or Wales. Such a record had not occurred during the previous 50 years. In 1900, there was what (the disease being extremely rare) we may call an epidemic in South Wales, eleven cases being reported.

That Orang-outangs use Sticks to Aid their Walking

An inexperienced actor or speaker does not know what to do with his hands, and apparently artists experience a like

difficulty in disposing of the hands of their first cousins, for in many pictures of these anthropoid apes they are shown clasping long sticks. These creatures are very agile climbers, but are slow at moving along on ground. Their arms being much longer than their bodies, they are able to use them as a lame man uses crutches, and swing their bodies forward. In doing this, the hands are not put palms down on the ground, but the backs of the first and second portions of the fingers are placed on the ground, thus making the effective length of the arms still greater.

That Cows eat Buttercups, and that the Quality of their Milk is thereby Improved

The Field of June 9, 1906, exposed this old belief, calling our " dear little buttercup, sweet little buttercup " a useless and obnoxious weed, having no value as a food for cattle, for the simple reason that cows and other cattle won't eat them, and consequently they cannot very well improve the tone of the butter. Their presence in a pasture indicates the richness of the soil, and hence its ability to produce a heavy crop of rich milk-yielding grass. Dr. Brewer supports these statements : " The cow in every possible way does its best to avoid the buttercup, which is a nauseous, bitter herb, and, in walking through pastures as bare as possible, the buttercup is left in all its luxuriance. Cows may be seen tearing away the grass round a buttercup plant (*Ranunculus bulbosus*), and leaving it untouched, with every particle of grass cropped close round it. Indeed, you may see pasture apparently most luxuriant, but on a closer inspection there is nothing but buttercups left. Farmers like to see them, because they prefer good, sound, dry, old pastures, and the remainder of the herbage is generally good. But cows avoid them as much as possible."—*Athenæum*, No. 1,489.

That the Okapi is a Hybrid between a Zebra and a Giraffe

In the Natural History Museum, South Kensington, London, there was, in July, 1906, a case with a couple of okapi in it, and on the case was a label stating, " The idea that the okapi is a hybrid between a zebra and a giraffe is erroneous."

That Monkeys when searching through their own or other Monkey's Hair are looking for Fleas

The author feels sure that his readers will experience considerable satisfaction on learning that this is one of

many fallacies by which he has been " had " by his friends ! All he can plead is that his belief is at least a very popular one, and consequently he is pleased to be able to quote from such a convincing source in refutation of the error. At p. 12 of the fifth edition of the *Illustrated Official Guide to the London Zoological Society's Gardens in Regent's Park*, by Dr. P. Chalmers Mitchell, M.A., D.Sc., F.R.S., the Secretary to the Society, he says : " It may be interesting to note that, in spite of an almost universal belief, monkeys are extremely rarely infested by fleas. No doubt their own habits protect them, as fleas would have small chance of escaping the attentions of the friends of their hosts ; but in most cases, a monkey searching another monkey is not hunting for fleas, but for little masses of a salt-tasting secretion which occasionally exudes from the pores of the skin."

" Monkeys have no fleas. This is an assertion that is commonly received with surprise and incredulity. Occasionally a gorilla or a chimpanzee may get a chigoe in its toe. And monkeys in Zoological gardens or menageries are possibly exposed to the danger of catching an occasional human flea from the people who crowd round their cages. These are remote contingencies which may happen to anyone. Healthy, wild monkeys are much too clean and active to harbour fleas. When they search one another's fur in a fashion that must be familiar to most persons, they are clearing their coats of particles of scurf or of similar scraps of dirt and not of fleas. So, speaking generally, it may be said that no fleas have been found truly parasitic on monkeys."—p. 12, *The Flea*, by Harold Russell, B.A., F.Z.S.

Mr. Bijaykumár Gánguli, B.A., Deputy Magistrate of Hooghly, Bengal, sent on Sept. 21, 1915, a number of careful notes on the 2nd ed. of this book, and on this fallacy his note is, " I have seen a number of monkeys licking the efflorescence on a brick wall, the bricks having undergone the process of ' saltpetring.' "

That Bats are Blind

This error is expressed in the common phrase " as blind as a bat."—Brewer's *Dic. of Phrase and Fable* gives :—

" Blind as a bat. Bats are not blind.
Blind as a beetle. Beetles are not blind.
Blind as a mole. Moles are not blind.
Blind as an owl. Owls are not blind."

So the makers of language have been particularly unfortunate in their choice of these similes!

Bats are not blind, though they are nocturnal in their habits; they are the only purely nocturnal animals in this country. Consequently they are not well adapted or used to much light, and if they do come out in the day time, they are inconvenienced by the glare, just as we are when visiting a white marble quarry on a sunny day, or when walking along a whitish road in Egypt or South Africa.

"Their [bats'] daylight sleep paralyses them, though not because they are unable to see and fly with safety in the sunlight, for they can do both: But if handled and disturbed, they make no effort even to spread their wings, and seem unable to shake off the drowsy influence."—p. 11, *Animals at Work and Play*, C. J. Cornish.

That a Flying-Fox is some sort of Quadruped

To begin with it is not a fox but a bat. A flying-fox is a large frugivorous bat of the family *Pteropodidæ* and especially of the genus *Pteropus*. Flying-foxes are common in India, Japan, Madagascar, and Australia. Their flight is slow, steady, straight and of long continuance. The name "fox" has arisen from the fox-like shape of the head.

That a Dolphin is a Fish

A dolphin (*Delphinidæ*) is a Cetacean to which order whales also belong, and the Cetacea are mammals, *i.e.*, hot-blooded, air-breathing animals which produce their young alive and feed them with their own milk. A porpoise (*Phocæna*) is also a Cetacean and much like a dolphin, but while a dolphin's snout is prolonged into a sort of beak, a porpoise has no such prolongation and its muzzle is short and uniformly rounded.

A characteristic feature of the *Cetacea* is that their tail fins are horizontal whereas the tail fins of fish are vertical.

That Bloodhounds are Bloodthirsty and Ferocious, and Bull-dogs Savage

"But for the efforts of a few private gentlemen, this keen-scented breed was in danger, some forty years ago, of extinction. Yet in earlier times, before a speedier animal had been evolved by cross-breeding, the bloodhound had

been the principal dog of the chase. The bloodhound has an absurd reputation for ferocity, partly due to the libellous pages of ' Uncle Tom's Cabin,' and still more to his name, the probably true origin of which may surprise many. Only a century ago he was often spoken of as a ' staghound,' and his present name probably embodies the idea that he represents the original stock from which all other types of British hounds have arisen, and that he is thus the blood hound in the same sense that the Barbary Arab is the blood horse. His true nature is not bloodthirsty."—*T.P.'s Weekly*, Aug. 28, 1908.

The *Century Dict.* has nothing in support of the popular belief, and Mr. C. Nicholson, B.E.A., wrote on Nov. 7, 1908, " Both quite wrong. Both are gentle, affectionate, and I believe faithful." *Harmsworth Ency.* denies that bloodhounds are fierce and states on the contrary that they are singularly docile, affectionate and intelligent.

" The bloodhound is rather unmanageable when thoroughly roused, on account of his courage and strength, but when properly treated is generally docile, and makes a capital watch-dog."—*Cham. Ency.* II., p. 237.

" Bull-dog . . . the most fearless of animals, but in disposition is so lazy that he is slow to take offence, though he will fight to the death if attacked. The bull-dog is a most devoted and faithful companion, his affection being mainly centred on one person."—*Chamb. Ency.*, II., p. 540.

That Moles are Blind and Eat Roots and Bulbs

" Pray you, tread softly, that the blind mole may not
Hear a foot fall : we now are near his cell."
The Tempest, IV., i., 194.
" The blind mole casts copp'd hills toward heaven."
Pericles, I., i., 99.

" What modes of sight betwixt each wide extreme, the mole's dim curtain, and the lynx's beam."—Pope, " Essay on Man."

" A Mole is a little beast somewhat like unto a mouse. And he is damned in everlasting blindness and darkness, and is without eyes. . . . And the Mole hath none eyes seen without, and who that slitteth the skin subtly and warily should find within the pores [*i.e.*, traces] of eyes hidden."—Bartholomew (Berthelet), Book XVIII., Sec. 102.

Chap. 18 of Book III. of *Vulgar Errors*, by Sir Thomas Browne, M.D., is devoted to refuting the error, " That moles

are blind." This was written in 1646 and for all that the belief is still current. Sir Thos. writes in his quaint way, " . . . for that they have eyes in their head, is manifest unto any that wants them not in his own. . . . and if the eagle were judge, we might be blind ourselves." Practically all writers agree in stating that the sight of moles is poor, *e.g.*, Sir Thomas, further on, says, " But as their eyes are more imperfect than others, so do we conceive of their sight or act of vision, for they will run against things, and huddling forwards fall from high places. So that they are not blind, nor yet distinctly see: . . . "

In a note to this chapter, the editor, Mr. Simon Wilkin, says, " The eyes of the mole are so extremely minute, and so perfectly hid in its hair, that it is not wonderful if careless and casual observers have pronounced it blind."

" It appears that this animal was not known to the ancients, who have been very wrongfully accused of having fallen into the gross error of supposing that the mole had no eyes. . . . The researches of modern times have ascertained that this illustrious naturalist [Aristotle] was perfectly right in refusing the organs of vision to the mole of his native country [Greece]. There does, in fact, exist in that country a little subterraneous animal totally deprived of sight." —Cuvier's *Animal Kingdom*.

Harmsworth Ency., under *Talpa europæa* says, " There is no external ear, and the eyes are minute."

" . . . with very small or rudimentary eyes and ears."—*Century Dict.*

" The eyes of moles and of some burrowing rodents are rudimentary in size, and in some cases are quite covered by skin and fur."—p. 102, *Origin of Species*, Chas. Darwin.

Moles feed almost entirely on earth worms, though no kind of flesh seems to come amiss to them. They will not touch vegetables as a food, but in hunting for worms they bite through roots.

" The large earth-worm, or lob-worm, is very much frightened of the mole; and whenever it feels the earth moving, it mounts to the surface to escape from this insect-hunter."—Houzeau, *Etude sur les Facultés Mentales chez les Animaux*.

" I have kept several Moles and never saw them eat anything but worms."—Rev. J. G. Wood, p. 6, *Strange Dwellings*.

"The food of moles chiefly consists of worms and the larvæ or grubs of insects, of which they eat enormous quantities."—Mrs. R. Lee, p. 34, *Anecdotes of Animals*.

". . . in search of the worms and grubs on which they subsist."—W. Furneaux, F.R.G.S., p. 313, *The Outdoor World*.

Dr. Chatterton said at the Casual Club on Nov. 6, 1919, that he had dissected many moles and found that in every case they had eyes and that their eyes were sensitive to light, though it was true in many cases their sight is very defective.

That the extinct forerunners of existing Animals were much Bigger than recent kinds, and even Gigantic

That this opinion is incorrect we may learn from Sir Ray Lankester, F.R.S., who wrote in the *Daily Telegraph*, of Feb. 12, 1910, "In fact, no one doubts that (leaving aside a few difficult and doubtful cases), all such big existing mammals as I mentioned above [cattle, pigs, horses, rhinoceroses, tapirs, elephants, lions, wolves, bears, etc.], as well as monkeys and man, are derived from small mammals—intermediate in most ways between a hedghog and a pig—which flourished in very early Eocene times, . . . Even the elephants came from such a small ancestral form. The common notion that the extinct forerunners of existing animals were much bigger than recent kinds, and even gigantic, is not in accordance with fact. . . . But the recent horse, the recent elephant, the giraffe, the lions, bears, and others are bigger—some much bigger—than the ancestral forms to which we can trace them. . . ."

In *From An Easy Chair* (1909), Sir Ray says (pp. 6-8), "The biggest African elephant may, perhaps, stand 13 ft. at the shoulder. No mammoth or other extinct elephant seems to have exceeded this. No extinct animal is known which approaches in bulk the great whales of various kinds at present inhabiting the sea."

That Porcupines and Hedgehogs Can Shoot Out their Quills

Longfellow in his *Song of Hiawatha* (Canto "Hiawatha's Sailing") says:—

"From a hollow tree the Hedgehog
With his sleepy eye looked at him,
Shot his shining quills like arrows
. . . .

In the case of the hedgehog the maximum length of the spines or quills is only about one inch.

"The armature of spines is of the greatest value to the porcupine, though their use is entirely for defensive purposes. It is hardly necessary to deny the popular belief that the animal can shoot out its quills like so many arrows; the notion has arisen from the fact that when the animal erects its spines loose ones sometimes fall out."—*Chamb. Ency.*

"The spines grow mostly on the rump and back of the broad flat tail; they are quite loosely attached, and when the animal slaps with its tail (its usual mode of defence) some quills may be flirted to a distance. Something like this, no doubt, gives rise to the popular notion that the porcupine 'shoots' its quills at an enemy."—*Century Dict.*

A hedgehog runs from its enemy, stops suddenly, and thus impales its pursuer on its quills. The bacterial dirt on the quills completes the story!

That Squirrels are Very Shy Animals

"SIR,—Squirrels, as a rule, are supposed to be very shy animals; that, however, is not the case, for if they are fed during the winter months they become quite tame and remain so, and will pay you daily visits all the year round, no matter what the weather is like. We had six daily visitors, and after they had eaten all the nuts they wanted they would take as many more as you cared to give them and go and bury them in the woods around the house; but, strange to say, they appear to forget where they have hidden them, for the writer has marked places where they were buried and on visiting them weeks after discovered the nuts still there, and has never seen any of them unearthing their hidden food. No matter how hungry they are, they will not eat ground-nuts or what are commonly called monkey-nuts or pea-nuts. Walnuts, Brazil nuts and Barcelona nuts are all favourites with them. The squirrel was enticed down from the tree by the rattling of a tin containing nuts. Some were taken out and shown him, and up he climbed, made himself at home and had a feed.—J. A. JARVIS."
Country Life, Dec. 24, 1920.

Several references to squirrels mention that they are readily tamed, and the familiar rotating cage for squirrels indicates that they are not shy.

Squirrels may be seen feeding from people's hands in Regent's Park where a number have been set free. They are exceedingly tame in Central Park, New York City, where they " beg " for monkey-nuts from the passers-by.

That there is a Variety of Domestic Cat which has Pendent Ears

In the days of our boyhood, lop-eared, or pendent-eared, rabbits were greatly prized, and apparently a lop-eared cat might fetch a very fancy price as it would be unique, for *Chamb. Ency.* tells us that, " No cats with pendent ears exist, in spite of frequent statements to the contrary."

That African Elephants Cannot be Tamed and Trained as Indian ones are

Jumbo, than whom no elephant has ever been better known, was an African elephant.

" The African elephant, once trained for war and pageantry, is no longer tamed, apparently from lack of enterprise."—*Chamb. Ency.*, Vol. IV., p. 290.

It was the African elephant which the Romans used to train.

" It would appear that the intelligence of the Indian form has been overrated."—*Harm. Ency.*, Vol. IV., p. 268.

Mr. Carl Hagenbeck is quoted by Mr. C. J. Cornish in his *Animals at Work and Play*, p. 151, as saying, " The general belief that African elephants are not so strong as, are wilder and less easily tamed, and possess less endurance than, the Indian species, is wrong." He maintains, on the contrary, that they are stronger, and at least as tractable, and as useful as beasts of burden or to be ridden, as Indian elephants ; and he claims to have convinced the Berlin Geographical Soc. that this view is correct, as early as 1878, when he had a number of African elephants in that city.

Dr. Sclater, the late Secretary of the Zoological Soc., London, gave it as his opinion that African elephants are quite as intelligent as the Indian species, though perhaps not equally docile.

Vide Travels of Mungo Park, pp. 9 and 235.

That Man is the only Animal which Laughs

Sir Ray Lankester, F.R.S., dealt with the subject of laughter in the *Daily Telegraph* of Jan. 2, 1912 :—

" Many monkeys laugh, some of them grinning so as to show the teeth, partly opening the mouth and making sounds by spasmodic breathing, identical with those made by man. I have seen and heard the chimpanzees at the Zoological Gardens laugh like children at the approach of their friend and my friend, the distinguished naturalist, Mr. George Boulenger, F.R.S., recognising him among the crowd in front of their cage when he was still far off. And I have often made chimpanzees laugh—' roar with laughter,' and roll over in excitement—by tickling them under the arms. The saying of Aristotle (inscribed over the curtain of the Palais Royal Theatre in Paris) that ' laughter is better than tears, *because laughter is the speciality of man,' is not true.* Not only do the higher apes and some of the smaller monkeys laugh, but dogs also laugh, although they do not make sounds whilst indulging in the ' spasms of laughter.' But their distant cousin, the hyena, does laugh aloud, and its laughter agrees with that of the dog and with the laughter of children and grown men in simpler moods in that it is caused by the pleasurable emotion set up by the imminent gratification of a healthy desire. The hyena laughs, the dog grins and bounds, the child laughs and jumps for joy at the approach of something good to eat."

That Docking the Tail of a Horse Strengthens the Back of the Animal, and makes it Easier and Safer to Drive

The reader is referred to the penny pamphlet on this subject by Stephen H. Terry, M.Inst.C.E., and published by the Roy. Soc. for the Prevention of Cruelty to Animals.

" Inspector Allcorn, Royal Society for the Prevention of Cruelty to Animals, said that at the stables of Mr. Hartley he saw two horses which had been recently docked.

" Mr. William Hunting, an ex-president of the Royal College of Veterinary Surgeons, said that docking was not necessary either for the comfort or the well-being of horses. It was only justifiable where a horse was a leader of a team or was attached to a tip-cart. The operation did not strengthen the back of the animal.

" Mr. Alexander Piesse, M.R.C.V.S., gave his opinion that docking was extremely painful to the animal.

" Mr. Curtis Bennett, counsel for the defence, said Mr. Hartley had fifty horses, and they were all docked. He did not know that it was wrong, and thought it was safer for

driving about London streets to use docked horses. This was the first case of its kind in London, and counsel urged that as the docking was reasonably necessary there could be no conviction.

"Mr. Cecil Chapman, the magistrate, said there was nothing in the evidence to show that the practice was reasonably necessary. The docking of horses was founded upon ignorance, but, having become a custom, it prevailed long after the ignorance had been exposed."—*Daily Mail*, July 11, 1911.

"On a small plateau in the middle of his estate at Surrenden Park, Kent, surrounded by a panorama of grateful green, Mr. Walter Winans yesterday gave an exhibition of his undocked horses.

"'When a horse's tail is docked,' explained Mr. Winans, 'it is cauterised with a hot iron. Being a very timid animal, a horse never forgets the operation, and that is why it is so dangerous to touch the tail or quarters of a docked horse. Sometimes a horse is so sensitive that he can never be harnessed, it being impossible to get his tail into the crupper (the strap that passes under a horse's tail).

"'Again, the tail is the horse's natural protection against flies. It is also an aid in taking a corner. My horse Oberon will turn at top speed, using his tail as an air rudder. All my horses are undocked, and not one of them is afraid of having his tail touched.'

"To illustrate his theory, the most nervous mare in Mr. Winans's stable was driven with the driver pulling at her tail. A two-year-old foal was driven on foot with long reins under his tail, between his legs, and a tin box of stones tied to his tail and dragging on the ground. Neither of these undocked horses showed the least sign of nervousness.

"Lastly, a hurdle was set on fire by means of paper and petroleum. Rider and horse leapt fearlessly through the middle of the flame. It was a thrilling sight that sent a momentary shudder through the spectators."—*Daily Mail*, May 9, 1913.

"The Duke of Connaught expressed himself strongly against the docking of horses' tails at a meeting at Ottawa, according to the Ottawa *Evening Citizen*.

"'Personally,' said his Royal Highness, 'I think the docking of horses' tails is a relic of barbarism. I know that the horse dealers will not agree with me. I think it is a

shame to deprive a dumb animal such as a horse of the tail God has given it.'

"The Duke also said he deplored the practices of fast driving and overloading which he understood were the most prevalent forms if inhumanity to horses in Ottawa." —*Daily Mail*, Jan. 3, 1913.

A short, illustrated article on the subject appeared in *The Animal World* for Sept., 1911.

The late G. F. Watts, R.A., wrote to *The Humanitarian* on Sept. 13, 1896, and the letter was published in the issue of Nov., 1896. It was re-published in the issue of Feb., 1913 :—"The brutal fashion of docking horses is a disgrace to our civilisation and cannot be too strongly protested against. Cropping dogs' ears was, I believe, put down ; docking is far worse ; indeed it is, I think, far more degrading than bull-fighting. There is, in that, courage and address, though in a bad cause ; for the practice of docking, a mere caprice of fashion, nothing can possibly be said—indeed, the short agony in the time of excitement is probably less than that suffered by the horse in the protracted time during the brutal (I wish I could find a stronger word) operation and the healing of it.

"With regard to the artistic side, there is degraded want of taste in destroying the harmonious balance of Nature's arrangement—the somewhat heavy head of the beautiful animal being balanced by the tail, which naturally should have considerable volume. Setting aside the disgusting cruelty, this want of taste, which can prefer to see this noble creature changed, by the destruction of the fine appendage, into a thing that resembles the stump of a worn-out broom—made to resemble a pig or a tapir—is very lamentable, when found among the classes that can boast of education and refinement. The cruelty is barbarous in those who practise it, infinitely degrading in those who encourage it from so mean a motive as fashion—only not contemptible because so much worse."

THE KING'S REGULATIONS.

"14. Paragraph 1224.

"Docked horses will not be accepted."

That all Squirrels Hibernate throughout the Winter

There is considerable difference of opinion on this point among the authorities.

Macgillivray (Manuel) says that, "When the cold weather commences, it (the squirrel) becomes less active, and often dozes for days in its retreat, but it does not become completely torpid; and I have seen it abroad in the midst of a most severe snowstorm. If the weather be comparatively mild, it exhibits its usual activity, feeding on bark and twigs."

This is quoted by R. Lydekker, F.R.S., in his *Handbook to the British Mammalia*, in which he remarks: "The latter sentences of this account show conclusively that it has long been a well-known fact that squirrels do not hibernate in the proper sense of the word."

Several observers have noted that traces of the squirrel's activity are generally to be found in woods and plantations during snowy weather.

W. Furneaux, F.R.G.S. (*The Out-door World*, 1893, p. 308, says, "Some spend the Winter months in seclusion, and lay in a store of food sufficient to last them through the barren season; while others are true *hibernators*, remaining in a state of slumber throughout the cold months, taking no food during the whole time. But even these hibernating species do provide a store, though unconsciously; for, during the time of plenty, their appetite leads them to devour more food than is necessary for present nutrition; and the excess gives rise to a store of fat that is gradually consumed in their slumbers. But this disappears by the springtime, and they emerge from their retreats in a lean and hungry condition."

The Rev. J. G. Wood, M.A., F.L.S., *Strange Dwellings*, 1873, p. 119, "As is well known, the Squirrel constructs two kinds of nests, or 'cages,' as they are popularly called, one being its winter home, wherein it can remain in a state of hibernation, and the other its summer residence."

". . . hibernates to some extent in the colder latitudes. . . ."—*Century Dict.*

Chamb. Ency., Vol. IX., p. 667, "In Winter the Squirrel hibernates, awakening from time to time to feed on its stores."

The fact that they store food for the Winter certainly seems to imply that they do not hibernate, or do so only partially.

Another statement is that when they store an unusually large quantity of food, the Winter is going to be severe. This is of a piece with the dictum that an abundance of

hawthorn berries is a sign of a coming sharp Winter. The former merely means that there was an abundance of nuts in the Autumn and so the squirrels were able to store more.

That it is Correct to Call certain Powerful Members of the Bovine Tribe in America "Buffaloes"

Sir Ray Lankester, F.R.S., wrote in the *Daily Telegraph*, July 11, 1912, "It [the European species—*Bison bonasus*] differs but little from the American bison, which is the only bovine native to any part of the American continent. Owing to a mistake on the part of the early Spanish settlers, the American bison was confused with the buffalo, and the name thus wrongly given is still used for the bison in America."

Longfellow correctly calls them bison in *Hiawatha*.

That the Throats of All Whales are Comparatively Small

In dealing with the fallacy "that Jonah was swallowed by a whale," we have given a quotation, p. 95 of *Helps to the Study of the Bible*, Oxford, 1891, wherein it is stated, "A whale has too contracted a throat to swallow a man," and this is certainly a popular idea. In fact we have heard it said that a whale could not swallow a large herring! Frank T. Bullen, First Mate, in his *Cruise of the "Cachalot"* agrees that the whale-bone whale has a small throat, but makes it amply evident that the sperm whale, or cachalot, has an enormous throat. At p. 53, he writes, "The other matter which impressed me was the peculiarity of the teeth. For up till that time I had held, in common with most seamen, and landsmen, too, for that matter, the prevailing idea that a 'whale' lived by 'suction' (although I did not at all know what that meant), and that it was impossible for him to swallow a herring. Yet here was a mouth manifestly intended for greater things in the way of gastronomy than herrings; nor did it require more than the most casual glances to satisfy one of so obvious a fact. Then the teeth were heroic in size, protruding some four or five inches from the gum, and solidly set more than that into its firm and compact substance." At p. 139, he estimates that some of the pieces of food ejected by a cachalot measured 8 ft. by 6 ft. by 6 ft.! They were apparently pieces of cuttle-fish, the size of which reptile he indicates at pp. 140-1, where the diameter of the eyes is given as one foot! ". . . a shark

fifteen feet in length has been found in the stomach of a chachalot!" *Cruise of the "Cachalot,"* p. 271.

The life-size models of whales at the Natural History Museum, South Kensington, should help to kill this fallacy. The notice by the life-size model of the cachalot whale in the Nat. Hist. Museum states that, "The chief food of the cachalot consists of cephalopods (Squid and Cuttlefish), some of enormous size."

That all Dogs have Distemper Between the Ages of 7 and 14 Months

A dog fancier informs us that distemper may be contracted by a dog at *any* age between 7 days and 9 years, and that it is rare for a dog to have it twice, though such cases have occurred.

Distemper is an infectious catarrh of the mucous membranes of the eyes and respiratory and digestive organs. "Nearly two-thirds of all cases of distemper occur in dogs under one year old; one-third in dogs over one and under two years; the disease is rare in dogs over two years old. . . . As a rule, one attack confers immunity for life, but there are exceptions. . . . The average mortality is about 50 per cent."—*Harmsworth Ency.*, IV., p. 26.

That the "Glutton" Eats Excessively

"The 'glutton' is another subject of Northern myth; there is no foundation for its alleged excesses in eating, or for other curious habits chronicled by mediæval naturalists; but these stories are still current among the Samoyeds, and were quoted by the voyagers just as they heard them."—C. J. Cornish, p. 304, *Animals at Work and Play.*

"Its name has been derived from exaggerated accounts of one species, the *Wolverine* of North America."—Prof. T. Rymer Jones, F.R.S., p. 414, *The Animal Creation.*

That Hedgehogs usually Eat "Black beetles"

"Black beetles" are neither black nor beetles and in referring to the above matter in his *Animals at Work and Play*, p. 260, C. J. Cornish, says, "No four-footed creature that we know will eat them except the hedgehog, and cats, which are said to be poisoned by them. This is hardly strange, for everything which they touch is contaminated by their repulsive

odour. Even hedgehogs are a failure, though tradition makes them thrive on cockroaches. An early ambition of the present writer's was to live in a house stocked with black beetles, in order to keep a hedgehog. At last this came about. The new house swarmed with the insects; and we had the luck to find a hedgehog in a cowshed, and brought it home. It would not uncurl in the kitchen, so we put it in a dark cupboard, where there were enough of the creatures to 'feed right a great hog,' as the cook, who was disappointed in the animal's size, remarked disparagingly. But the hedgehog *never* uncurled. We looked at him night and day, and found beetles running over him, and speculating when they would begin to eat *him*. At last we carried him to the lawn, where he did move, and walked into the tennis-net, and had to be cut out, to the great destruction of the meshes."

Mr. Donald Gunn, writing on Sept. 25, 1919, said, "That the cockroach is freely eaten by the hedgehog is certain enough. I doubt if there is any insect or crawling thing, including slugs and snails, that the hedgehog will not eat," and he pointed out that Sir Harry Johnston in his *British Mammals* draws attention to the fact and says, "It is one of the few vertebrates which will willingly eat a cockroach."

Mr. Percival Westell, at p. 134 of his *Story of Insect Life*, says hedgehogs are particularly fond of cockroaches. So the evidence is conflicting.

Vide article by Miller Christy at p. 242, *Nature*, Oct. 20, 1921, and *Nature*, May 19, 1921, p. 375.

That a Beaver Uses its Broad Flat Tail as a Trowel

John Timbs, F.S.A., *Things not Generally Known*, p. 71, is emphatic about the above being an erroneous idea. "The stories of the Beaver using its long, broad, flat tail as a trowel are impositions on the credulous. The tail is altogether unfitted for such operations; for mixing up the mud with other materials the animal employs its fore-paws and the mouth; while it employs the tail in the water as a paddle and rudder, to urge itself onward, and to direct its course. . . ."

"Beavers are large Rodent Mammals, with naked, trowel-shaped tails with which they steer themselves in swimming, or use to beat the water as an alarm signal."—P. Chalmers Mitchell, M.A., D.Sc., F.R.S., p. 105 of the 5th ed. of the official guide to the 'Zoo.'

The Rev. J. G. Wood, M.A., F.L.S., p. 411, *Homes without*

Hands, says, " . . . the broad, paddle-like tails, . . . " But there is nothing suggesting that the tail is used like a trowel. He does, however, point out the faultiness of the illustrations of beavers building a dam, and then goes on to describe how the dams are made.

Harmsworth Ency. says, " the scaly, horizontally flattened tail, used as a rudder in swimming."

" The beavers carry the mud and stones with their fore-paws and the timber between their teeth. They always work at night and with great expedition."—R. Lydekker, F.R.S., *Ency. Brit.*, 11th ed., III., p. 600.

No mention is made of the use of the tail.

The *Century Dict.* is the only one supporting the popular view.

That Marmosets are Entirely Frugivorous

On taking a pair of marmosets for presentation to the ' Zoo ' on Apr. 14, 1915, the assistant superintendent told us that they should have an insect as well as a fruit diet, and said that at the ' Zoo ' they gave the marmosets all the spare insects from the Insect House. We saw our pair eat about 10 meal ' worms ' with great relish, for they had been kept to a fruit and bread diet since leaving Bahia about two months previously.

" Their diet consists of a mixture of insects and fruit." —*Harmsworth Ency.*, VII., 160.

" . . . they live in the woods and feed chiefly upon insects."—*Century Dict.*

That Cats are always more Attached to the House than to the People in it

" That a cat loves the house more than the master is usually the case, but it is not by any means universally true. One cat here has followed us on several moves, and immediately settled down with extreme content in its new quarters. The other received us with perfect courtesy, refusing, as it had done several times before, to leave the building.

" Hassocks. PERCY ADDLESHAW."

Notes and Queries, Sept. 25, 1915, p. 244.

" Cats are usually attached to a house, and not to the owner, much as wild felines—lions, tigers, etc.—are attached

to their lairs. It is the survival of a homing instinct, and, though many instances may be adduced of attachment to the person, yet these are not sufficient to outweigh the general statement."—Chas A. Arkle, *Ibid.*

"The dog's affection for his master is due to the fact that he comes from a type that lives and hunts in a pack, subject to the autocratic control of a strong leader. If a member of such a pack does not obey orders, its life is not likely to be a long one! Hence the dog's apparent love for his master is merely the inherited instinct of strict obedience —or death.

"The cat, on the other hand, comes of a type used to a solitary existence, and, though its affection may be intense, its independence can never be eradicated.

"Those who make companions of cats know how devoted they are to their masters and to their young—the latter is not a stong feature in dogs.

"60, Stapleton Road, S.W. CHARLES PLATT."
Notes and Queries, Nov. 27, 1915, p. 428.

"As a lover and keeper of cats for more than 60 years, I can say that cats are more attached to their owner than their home; but it depends upon the way they are treated. The deserted cat lingers about its home in the hope of meeting with its friends. A forsaken cat is a pitiable creature, and will accept kindness from strangers, but will readily return to its first love—when it can. A cat which I lost through her being chivied away by boys came home after 5 weeks, when she sang for joy and shed tears with sobs of satisfaction as she clung to me. THOS. RATCLIFFE."
Notes and Queries, Sept. 25, 1915.

Some friends took their black tom cat with them from Hampstead Garden Suburb to Burnham Overy Staithe, Norfolk, for their holiday during Sept. and Oct., 1917, and he stayed with them without any trouble though allowed full freedom.

"Cats will form strong attachments to persons who take pains to gain their affections. I have never had any difficulty in inducing my cats to settle when I changed my lodgings. It is only natural, however, if a cat prefers its old hunting-grounds to the society of a person who does not care for it."—F. Newman, at p. 245 of *Notes and Queries*, Sept. 25, 1915 (11 S. xii.).

That Cats get thin if they eat Flies.

Mr. Percy Addleshaw writing in *Notes and Queries* for Sept. 25, 1915, at p. 244, stated that, " The eating of flies is a habit to be discouraged. Cats addicted to the habit become thin and ill. It is the morphia habit of the feline world."

In spite of this opinion, the balance of the evidence seems to be against the popular view, as the following extracts show :—

" I doubt whether eating flies has much to do with the thinness of cats in Summer. When I lived in Jamaica, I noticed that the fine tom, which I had for 10 years, used to wander into the bush in fine weather, and return to the house, thin, before heavy rains began, when rats also sought shelter there. I thought his thinness was the result of increased bodily exercise in hunting."—F. Newman, *Notes and Queries*, for Sept. 25.

" I have known very thin cats which were wasting away, as if with consumption, eat flies, but I think the habit of doing so was caused by a false appetite to be traced to the presence of a tape worm in the animal. Twice, at least, in my experience ' consumptive,' fly-eating cats suffered from tapeworm. —I.M.T., *Notes and Queries*, Oct. 23, 1915, p. 330.

During the last 18 years we have had two very fine tabby tom cats weighing nearly 14 lb. each. Neither of them ate flies, but each of them always got thin in the Summer and fattened up for Xmas ! This thinning was a real loss of weight, though no doubt the thinner Summer coat added to the effect.

To sum up, this case appears to be the common one of two events (thin cats and flies both occurring in Summer), happening concurrently, though unconnected, and consequently the one being taken as the cause of the other without proper investigation.

That all White Cats are Deaf and have Pink Eyes

Darwin at p. 8, *Origin of Species*, " Some instances of correlation are quite whimsical : thus cats which are entirely white and have blue eyes are generally deaf ; but it has been lately stated by Mr. Tait that this is confined to the males. Colour and constitutional peculiarities go together, of which many remarkable cases could be given amongst animals and plants. From facts collected by Heusinger, it appears that white sheep and pigs are injured by certain plants, whilst

dark-coloured individuals escape: . . . Hairless dogs have imperfect teeth; . . ."

In answer to the author's query in *Notes and Queries*, Mr. Percy Addleshaw wrote on Sept. 25, 1915, at p. 244 (11 S. xii.), "Deafness may be more prevalent among white cats than others. I have heard it stated often. My experience—a large one—is that they can hear, when they want to hear, quite as quickly as anybody else. But a cat never obeys or answers unless it is 'so dispoged.'"

"Certainly all white cats are not deaf. I have been told that *all* white cats with pink eyes are so. I cannot, of course, say if this is true. I have only experimented on one, and it was totally deaf."—F. Newman in *Notes and Queries*, Sept. 25, 1915 (11 S. xii.).

The author experimented with a white tom cat at No. 1, Gong Lane, Overy Staithe, Norfolk, in Oct., 1917. Its eyes were not pink, but greeny yellow and it was not deaf.

Mr. Louis Wain, the well known cat artist, wrote in the *Daily Mail*, of Jan. 25, 1916:—"I myself have possessed both stone-deaf white cats and a blue Persian, and a long run of experiments showed that, although dead to ordinary sounds, they would invariably jump on top of the piano when it was played; they were also sensitive to the sound of whistles and jingling bells. Now either their hearing was sensitised to certain piercing sounds or else their nerves were sensitised to the effect of these sounds upon the atmosphere. It is common knowledge that even slight earthquake vibrations affect all animal life."

Donald Gunn, Oct. 18, 1919:—

"I had never had my belief in it shaken till recently, when I found at the Fine Art Society's Gallery, Bond Street, a beautiful white Persian cat with blue eyes, and satisfied myself that its hearing was perfect."

That Putting Butter on a Cat's Paws Will Prevent it Straying from a New Home

"Putting butter on a cat's paws succeeds in a great many cases—I find in most. Old country women say it always does. I can give one or two instances where it was ineffective. No sooner was the butter off than the cat followed the butter."—Percy Addleshaw, *Notes and Queries*, p. 244, Sept. 25, 1915 (11 S. xii.).

"Buttering cat's feet to keep them from wandering

appears to have no greater force than cupboard love, for I have known one—a notorious rambler—to ' hang around ' for many days in the hope of getting a spoonful of olive oil, of which it was inordinately fond."—C. A. Arkle, p. 245, *Notes and Queries*, Sept. 25, 1915 (11 S. xii.).

This is non proven: buttered or not buttered the cat may or may not stay in its new home.

That all Tortoise-Shell Cats are Females

" Tortoise-shell cats of either sex are exceedingly scarce. Males of this colour are almost unknown, and females are very scarce. Sandy-coloured cats are nearly all males, and it would appear as if the ' sandy ' tom is the male of the species of which the female is the tortoise-shell. The sexes of all cat-like animals follow a similar rule."—Chas. A. Arkle, p. 245, *Notes and Queries*, Sept. 25, 1915 (11 S. xii.).

" In one direction the tabby shows a tendency to melanism . . . while in the other direction there is an equally marked tendency to albinism. . . . A third colour-phase, the ' erythristic ' or red, is represented by the sandy cat, the female of which takes the form of the ' tortoise-shell,' characterised, curiously enough, by the colour being a blend of black, white, and sandy. . . . "—*Ency. Brit.*, 11th ed., Vol. V., p. 489.

" As a rule, it is the females alone in cats which are tortoise-shell, the corresponding colour in the males being rusty-red."—Chas. Darwin, p. 355, *Descent of Man* (1901).

" Why, again, with cats, the tortoise-shell colour should, with rare exceptions, be developed in the female alone."—*Ibid.*, p. 358.

" On the other hand, the tortoise-shell colour, which is confined to female cats, is quite distinct at birth. . . . "—*Ibid.*, p. 367.

" . . . an explanation—not a very easy one—of the rare occurrence of tortoise-shell males. . . . "—*Nature*, Dec. 30, 1920, p. 582.

That Collies are Treacherous Dogs

" From a long experience with these, as well as with other dogs, I am convinced that their so-called ' treachery ' is a base calumny on an exceptionally patient, long-suffering breed. I grant, however, that they are intensely nervous,

and their excessive animation needs the outlet afforded by an outdoor athletic life. It is usually those collies who are much pampered indoors, or used almost exclusively for 'show' purposes, against whom the accusation of snapping might be brought; but it is hardly fair to count this against the whole race, when the real fault lies with some mismanagement by the owners.

"A collie we previously had, and one which we now have, are miracles of patience and benevolence. An unduly affectionate cat and a troublesome terrier puppy have been known to sprawl over and rub against each large dog literally for hours on end; to put their noses into his dinner dish; to bite and pull his tail; and (on the puppy's part) never to sit anywhere except full on that warm golden side! But a growl or a snap is a thing unknown; the most either would do was to get up, finally, and lie somewhere else, for another session of torment. Our collies are equally magnanimous to children, wherever encountered. I particularly recall long journeys in railway carriages, where infant curiosity, of a most detailed kind, sometimes subjected them to a handling both prolonged and bothersome."—G. C. Guiney, *Notes and Queries*, p. 389, Nov. 13, 1915.

At p. 155 of Drury's *British Dogs* we read, "Of the many fallacies in connection with dogs that ought to be relegated to the limbo of forgotten absurdities is the very prevalent one that the Collie as a breed is treacherous. . . . Statements such as these are very damaging to a breed, and are the more regrettable since they are unwarranted by what is known of the breed as a whole. It is a slander, to say the least, on a most intelligent breed, for the modern Collie is not by nature treacherous, whatever may be said with regard to his remote ancestors. . . . The general character of the Collie is the reverse of treacherous, although he is not so ready to bestow his confidence in a 'love-at-first-sight' way, as some breeds which are accustomed to fawn and to be fondled are. His affections, once placed, are strong and his memory is tenacious; and these qualities, combined with his unusually high intelligence, make him one of the most interesting and pleasant of companions."

"The Scotch Collie perhaps enjoys more favour than any other dog. His intelligence is only realised when one sees a well-trained collie collecting sheep, detecting and expelling strangers, and, finally, folding the flock. He

exhibits the same intelligence in his amusements, and combines with it an affection and an exuberance of spirits that compel sympathy. The assertion, sometimes made, that the collie is treacherous, has no foundation in fact; and for devotion to a human master he is unexcelled. . . ."—*Harmsworth Ency.*

That the Proper Way to Lift a Rabbit is by its Ears

"How to Handle Animals.

"By S. Leonard Bastin.

"It is curious how few people know the correct method of holding an animal. In the opinion of a leading veterinary surgeon, many of our domestic pets are frequently injured by the improper way in which they are handled.

"Rabbits, for instance, suffer a good deal owing to the widespread idea that they should be lifted by the ears. This is really quite wrong, for in the case of tame rabbits the animals, as they grow up, become very heavy. It really hurts them very much to raise them by the ears.

"The proper method of holding the animal is to seize its skin just behind the shoulders. Rabbits lifted in this way show at once that they are comfortable, for they do not kick and struggle. Guinea-pigs should be held in very much the same manner; these creatures are exceedingly nervous and should not be handled more than is absolutely needful.

"Rats and mice, so often kept as pets by boys, should be lifted as little as possible, as it is easy to hurt their tender bodies. When it is necessary to lift them, do so by grasping the skin gently just behind the neck, taking care not to pinch too hard. . . .

"Ferrets, weasels, and stoats must be handled with care, if only on account of the fact that they can bite very severely. Seize the creature suddenly and rather firmly just under the forelegs. When putting the animal down let go your hold at once. These creatures are very quick in their movements and they will bite the hand that hesitates.

"Very tiny kittens may be lifted by the scruff of the neck, but this is not kind when pussy has grown to any size. A much better plan is to put you hand under the fore part of the cat's body and allow the back legs to rest on the arm.

"How would you pick up a fowl? Certainly not by its legs. That is a cruel method. The correct manner is to

seize the wings of the bird just behind the back. This is the way in which geese, and even swans are safely held. In the case of swans it is important to stand well behind the bird out of the reach of the terrible beak.

"A pigeon is held thus: Let the bird sit in the hand, with its head facing up the arm and its tail between the fingers. Small cage birds, like canaries, should be enclosed in the hand from the back, care being taken that they are not gripped too tightly."—*Daily Mail*, Feb. 25, 1919.

That there has ever been (during historic times) a Four-footed Mammal with one Horn called a Unicorn

"The lion and the unicorn fighting for the crown," and the royal arms depicting a unicorn are familiar to nearly all of us. In *Notes and Queries* of Oct. 30, 1915, at p. 349, Mr. A. R. Bayley gave three old references to the *horns* of unicorns, viz., one by Thomas Fuller of one which he had seen at the Tower of London and described in his *Worthies of England* (ed. Nicholls, 1811), II., p. 54; a second by Paul Hentzner, in his account of a visit to England in 1598 in which he describes a horn he saw at Windsor Castle, and the third by the Rev. Edward Topsell in his *Historie of Foure-footed Beastes* (1607), p. 717.

"St. Swithin" in the same issue of *Notes and Queries* says Hentzner testified to the Windsor one being valued at £100,000. "Very mean, after this, sounds a specimen at Somerset House mentioned in an inventory of Charles I.; it was priced at a poor £500." Other references are *Notes and Queries* of Oct. 16, p. 302, and Nov. 20, p. 406, both of 1915.

The following article appeared in the *Daily Mail* of June 26, 1914, and was accompanied by an illustration of the ornament:—

"Horn of a Unicorn.

"A unique Elizabethan ornament formed of a fragment of a 'unicorn's horn,' set in gold and richly enamelled, was exhibited last night by Mr. H. Clifford Smith, F.S.A., of the Victoria and Albert Museum, before the Society of Antiquaries at Burlington House, Piccadilly.

"A long spiral horn which, it was explained, was the tusk of the narwhal, an Arctic whale, was for centuries foisted upon the credulous as the horn of the fabled unicorn. It was generally cut up, and the precious fragments, sump-

tuously mounted, were worn as ornaments to ward off evil or bring good luck. When, suspended by its chain of gold, the horn was plunged into a poisoned dish it was supposed to sweat and change colour."

"The belief in the existence of a one-horned animal of this kind goes back to Aristotle (*Part. An.*, III., p. 663), who names as one-horned 'the oryx and the Indian ass.' . . . the authority of Aristotle determined the general form ascribed to the animal. . . . The familiar legend that the unicorn could be taken only by the aid of a virgin obtained currency through the *Physiologus.*"—*Ency. Brit.*, XXIII., p. 725.

At p. 398 of Vol. XV. of *Ency. Brit.* will be found a description of *Monodon monoceros*, the Narwhal or Sea-unicorn, and an illustration of its twisted tapered horn-like tusk which often is 7 or 8 feet long.

That a Black Roof to a Dog's Mouth Denotes Purity of Breed

Mr. Henry Robbins, the dog-fancier, says, "It means nothing of the sort, except in the case of Chows, when the whole mouth must be black." On consulting Drury's *British Dogs* (1903), there appears to be nothing in general on the subject of mouths, but under Chow at p. 544, we find, "The colour of the tongue is peculiar to the breed, and the fact of a dog having a black or partically black tongue would be a sure indication that there had been at some time a Chow-Chow cross, although the dog might not resemble the breed in any other respect."

That a Dolphin is a very Curved Creature

" his delights
Were dolphin-like; they show'd his back above
The elements they lived in:"
Antony and Cleopatra, V., ii., 89.

This is a mistaken idea which Sir Thomas Browne, M.D., dealt with in 1646 in his *Vulgar Errors*. He was referring in particular to their pictorial representation in his days. In sculpture they are still misrepresented. In Chap. II. of Book V., Sir Thomas says, "That dolphins are crooked, is not only affirmed by the hand of the painter, but commonly conceived their natural and proper figure. . . .

"Notwithstanding, to speak strictly, in their natural figure they are straight, nor have their spine convexed, or

more considerably embowed, than sharks, porpoises, whales, and other cetaceous animals, . . . And therefore what is delivered of their incurvity, must either be taken emphatically, that is, not really, but in appearance ; which happeneth when they leap above water and suddenly shoot down again : which is a fallacy of vision, whereby straight bodies in a sudden motion protruded obliquely downward appear to the eye crooked."

More convincing, even than Browne's quaint but correct explanation, is the appearance of an illustration of the animal in a reliable book.

That a Porpoise is a Fish

" Said I not as much when I saw the porpus how he bounced and tumbled ? they say they're half fish, half flesh ; "

Pericles, II., i., 23.

A porpoise is a mammal belonging to the whale family, and is therefore not a fish, for in a similar manner to all that glitters not being gold, so all live things that come out of the sea are not fish !

That the Struggle for Existence in the Animal World Causes the Animals Misery and Pain

At p. 272 of his *Life of Huxley* (1901), Dr. Chalmers Mitchell, F.R.S., quotes Alfred Russel Wallace, F.R.S., thus, " On the whole, then, we conclude that the popular idea of the struggle for existence entailing misery and pain in the animal world is the very reverse of the truth. What it really brings about is the maximum of life and of the enjoyment of life with the minimum of suffering and pain. . . . it is difficult even to imagine a system by which a greater balance of happiness could have been secured."

That Gorillas are Savage

There seems to be some conflict of evidence on this matter, but as we learn from Prof. Ernst Haeckel at p. 176 of his *Evolution of Man* that gorillas attain a height of 6 ft. 8 ins., a span of arms of 9 feet, and a chest twice as broad as that of a strong man, we recommend our readers *not to dispute the point with a gorilla !*

An unsigned, illustrated article on Gorillas appeared at pp. 739-747 of *My Magazine* for Dec., 1915. It strongly

supported the statement that gorillas are *not* savage if not molested.

I have seen it stated that a gorilla has never been kept in captivity, but for the past month (Sept., 1919) there has been a young one at the London 'Zoo,' and there are no signs of this being savage. It is a particularly playful creature and a boy of about 15 is provided by the authorities to be in the cage with it, to play with it, and show it off to the public. They have great fun, and it is difficult to say which enjoys this the more, the boy or the gorilla. It will be interesting to see what happens as this specimen grows up.

Mr. Donald Gunn, writing on Sept. 25, 1919, said, "Possibly gorillas say they are quite sweet tempered if 'let alone,' and I do not see that the point can be tested without molestation—or at any rate without interference with a gorilla's rights; for, like enough, he is prone to regard the intrusion of anyone within his 'sphere of influence' as unjustifiable interference. I purposely exclude the caged animal from the discussion (though I believe there is now one at our Zoo), for I am sure that I should be 'savage,' if caged."

That Manx Cats are the Only Tailless Ones

Ency. Brit., V., 205, speaks of a Malayan variety with short truncated tails, but does not mention any without tails, except the Manx ones.

Granger's *Marvels of the Universe, is said* to show that many cats in various parts of the world are without tails.

"Tailless Cats.

"The Manx cat came from the Isle of Man originally and is a distinct breed. In the Crimea is found another kind of cat which has no tail. These particulars are given in 'Con cerning Cats,' by Helen M. Winslow (1900), printed in Norwood Mass., U.S.A., and published in London by David Nutt.

"Whetstone, N. 20. H. Prosser Chanter."

"In Simpson's 'Book of the Cat' (London, 1903), chap. xxii. is given up to a consideration of Manx cats, and it is there stated 'that a Manx cat of the true type should have no particle of tail—only a tuft of hair which ought to be boneless.' The author does not mention throughout the whole of her exhaustive work any other breed of cat without a tail, and presumably there is no other, although she quotes from Gambier Bolton the tradition that one of the vessels of

the Spanish Armada, sinking near the Isle of Man in the memorable year 1558, had some tailless cats on board which had been procured during one of the vessel's voyages to the Far East. These cats swam to the rocks and made their way to shore, and from them have sprung all the Manx cats to be found in many parts of Great Britain and elsewhere.

" ARCHIBALD SPARKE."

Notes and Queries, June 17, 1922, p. 472.

" Col. R. H. Savage, in his ' An Awkward Meeting ' (1899), p. 174, refers to ' a superb tailless Corean cat,' but whether such abound in Corea he does not state.

" J. B. MCGOVERN.

" St. Stephen's Rectory, C.-on-M., Manchester."

Ibid., July 8, 1922, p. 38.

" No, the Manx cat is not alone. The Straits cat is said to have a horny hook directly on the rump ; the Burman cat shows its kinship by a similar growth but at the end of a tail of fair size. See ' The Burman, his Life and Notions,' by Shway Yoe (London, 1882), at i., 100.

" Boston, Mass. ROCKINGHAM."

Ibid., July 29, 1922, p. 97.

That Flying-Squirrels do in fact Fly

" The Flying Squirrels, though incapable of true flight, can float through the air for considerable distances by the aid of a parachute-like flap of skin connecting the fore and hind limbs."—P. Chalmers Mitchell, D.Sc., F.R.S., in the *Official Guide* to the ' Zoo.'

That what is commonly called the " Knee " of a Horse corresponds Anatomically with the Human Knee

" What is commonly called the knee of a horse is its wrist. The ' cannon bone ' answers to the middle bone of the five metacarpal bones, which support the palm of the hand in ourselves. The ' pastern,' ' coronary,' and ' coffin ' bones of veterinarians answer to the joints of our middle fingers, while the hoof is simply a greatly enlarged and thickened nail."—T. H. Huxley, F.R.S., *Lectures and Essays*, p. 37.

That a Rat-Trap should not be Handled with a Bare Hand, because if it is a Rat will Not Go into it

In reporting on the Rat Exhibition held in the gardens of the Zoological Soc., London, in 1919, *Nature*, Oct. 2, 1919,

p. 98, said, " A large number of experiments were conducted in order to ascertain whether there was any truth in the statement that rats are influenced by human odour. As a result of these experiments it was found that it was superfluous to avoid handling traps on the assumption that rats are detracted by the odour of man."

That Squirrels lay up larger quantities of Nuts when the Winter is going to be Unusually Severe

C. Nicholson, M.B.E.A., wrote Nov., 1908, " This is as much a fallacy, I believe, as the idea that an abundance of berries presages the same thing."

That the Teeth of Sheep Sometimes have a Deposit of Gold on them.

" In a paper ' On Dental Encrustations and the So-called " Gold-plating " of Sheep's Teeth,' published in the Proc. of the Linnean Soc. of New South Wales (Aug. 25, 1920), Mr. Thos. Steel gives an account of the so-called ' gold-plating ' and encrustations on the teeth of sheep and other animals. He states that the popular idea is so strong that the jaws of sheep are still taken from time to time to the Sydney Mint with the object of selling them for the gold supposed to be present.

" Mr. Steel refers to papers published in the Proc. of the Roy. Soc. of N.S.W. and of the Sydney Section of the Soc. of Chem. Industry in 1905, in which Prof. Liversidge showed that the encrustation is due to tartar deposited from the saliva in thin films. The golden colour and appearance are proved to be due to the reflection of light from the overlapping of the thin films, and in composition the deposit consists of impure calcium phosphate and organic matter, and not of iron pyrites, as confidently asserted by correspondents in *Nature* (Vol. xcix., 1917, pp. 264, 284, 290, and 306, and Vol. c., 1917, p. 106), to account for which various ' fantastic ' explanations are given. Prof. Liversidge stated that the deposit can be easily separated in thin flakes like mica with the point of a penknife, or even a pin, and that if a flake held on the point of a pin be placed in a match- or candle-flame it blackens, inflames, and leaves a white fusible residue ; hence neither a knowledge of chemistry nor the use of any chemical apparatus is necessary to prove the absence of gold and of iron pyrites.

" Mr. Steel has unearthed a forgotten statement by the late Dr. George Bennett in his *Wanderings of a Naturalist* (1834, p. 294), that the yellow ' metallic substance ' sometimes found on the teeth of sheep, oxen, and kangaroos, and frequently mistaken for gold, is simply tartar deposited from the saliva."—*Nature*, Apr. 21, 1921, p. 249.

FALLACIES CONNECTED WITH THE ANIMAL KINGDOM

(b) BIRDS

That Kingfishers have Nests Similar to the Majority of Birds

" Very early in the year the Kingfisher prepares its nest, which is at the end of a tunnel bored by itself in a bank, and therein six or eight white, glossy, translucent eggs are laid, sometimes on the bare soil, but often on the fishbones which, being indigestible, are thrown up in pellets by the birds; and in any case, before incubation is completed, these rejectamenta accumulate so as to form a pretty cup-shaped structure that increases in bulk after the young are hatched, but, mixed with their fluid excrements and with the decaying fishes brought for their support, soon become a dripping, fœtid mass.

" The kingfisher is the subject of a variety of legends and superstitions: its dried body is said to avert thunderbolts; and, if kept in a wardrobe, to preserve from moths the woollen stuffs therein laid; or, hung by a thread to the ceiling of a chamber, to point with its bill to the quarter whence the wind blows."—Prof. A. Newton, F.R.S., in *A Dictionary of Birds.*

That there is no such thing as Pigeon's Milk

" *Here comes Monsieur Le Beau. With his mouth full of news. Which he will put on us, as pigeons feed their young.*"

As You Like It, I., ii., 85.

There are certain glands in the crop of a pigeon which secrete a thick, white fluid, with which the young are partially fed.

Mr. Edward Jesse considers that the crop is gradually thickened, and the glands enlarged, during the period of incubation in most birds, just as the milk glands are prepared during gestation in mammalia; and Mr. Gulliver has shown that a process like that which takes place in the crop

of pigeons has been discovered in the female crocodile, reptiles and birds being closely allied.

That the Nightingale Sings at Night only

" The nightingale, if she should sing by day,
When every goose is cackling, would be thought
No better a musician than the wren."
Merchant of Venice, v., i., 104.

Notice that Shakespeare wrongly ascribes the song to the female.

Prof. Alfred Newton, F.R.S., in *A Dictionary of Birds*, says: " This bird is justly celebrated beyond all others by European writers for the admirable vocal powers which, during some weeks after its return from its winter quarters in the South, it exercises *at all hours of the day and night.* It is the cock alone that sings."

Daulias luscinia or *Daulias vera* is the nightingale that is common in Great Britain, and it is usually heard at night. The serenade is the love-song of the male, which ceases as soon as his propensities are gratified, as is usual with birds.

" It is a vulgar error to suppose that the song of the nightingale is melancholy, and that it only sings by night. There are two varieties of the nightingale: one which sings both in the night and day, and one which sings in the day only."—M. Wichterich, of Bonn.

That the Goat-sucker sucks Goats

This is a *very* old fallacy, for Aristotle speaks of it thus: " Flying upon the goats, it sucks them, whence its name."

On this subject Prof. Alfred Newton, F.R.S., in *A Dictionary of Birds*, remarks:—" The goat-sucker is a bird from ancient times absurdly believed to have the habit implied by the common name it bears in many European tongues besides our own, as testified by the Greek, Latin, Spanish, French, and German names. Its prey consists chiefly of moths and cockchafers."

Its scientific name is *Caprimulgus europœus* (Linn.), but should you not recognise it under this title, perhaps you may recognise one or more of the following names by which it is also known:—Night-jar, night-swallow, night-churr, tree-jar, goat-owl, fern-owl, churn-owl, and wheel-bird, the last from the bird's song resembling the noise made by a spinning-wheel in motion. It is one of the few birds that make absolutely no nest, but lays its eggs on the ground.

Prof. T. Rymer Jones, F.R.S., suggests that the fallacy arose from the circumstance of the birds frequenting fields where goats and sheep are herded, in pursuit of the insects that are attracted by the presence of those animals.

That Birds of Paradise have neither Feet nor Wings

"The birds were so named by the Dutch voyagers in allusion to the brilliancy of their plumage and to the current belief that, possessing neither wings nor feet, they passed their lives in the air, sustained on their ample plumes, resting only at long intervals suspended from the branches of lofty trees by the wire-like feathers of the tail, and drawing their food from the dews of heaven and the nectar of flowers. Such stories obtained credence from the fact that so late as the year 1760, when Linnæus named a particular species *Paradisea apoda*, or 'footless,' no perfect specimen had been seen in Europe, the natives who sold their skins to coast traders invariably depriving them of feet and wings." —*Ency. Brit.*

Besides the absence of legs and wings, the following wonders were once credited of this bird:—That the egg was laid in air, and there hatched by the male in a pocket in his body; that it never touched the ground during any period of its existence. The Some Indians are said to believe that the leader or king of the birds of paradise is black with red spots, and that he soars away with the rest of the flock, which, however, never quits him, but settles where he does.

All the varieties are indigenous to New Guinea and the neighbouring islands. There are about forty species.

Formerly it was also thought that swallows had no legs.

That Cutting a Parrot's Tongue (or the Tongue of any Bird capable of Talking) with a Sixpence, or keeping it without Water, makes it Talk Better

People are sometimes said to be "tongue tied." Apparently it is thought that birds may be similarly afflicted.

"Depriving the parrot of water, or cutting its tongue, will not enhance its power of talking. Both acts are brutal inhumanity."—Dr. John Torry, M.R.C.P.

"The cutting of the tongues of birds, or depriving them of water, under an impression that such ill-treatment makes good talkers, is not only an act of cruelty, but it is also a

fallacy. The law protects domestic birds, and persons guilty of cruelty to them may be prosecuted."—John Colam, Sec. to the Royal Soc. for the Prevention of Cruelty to Animals.

" The voice of birds is produced entirely by the syrinx ; the larynx no doubt modifies it, but the tongue seems to play no part in it. The ' loosening of the tongue ' by cutting its *frenum*, in order to assist a bird in talking, etc., is an absolutely silly operation."—*Ency. Brit.*, 11th ed., Vol. XXV., p. 413.

That the Pelican opens its Breast with its Bill and Feeds its Young with the Blood that Exudes

" That blood already, like the pelican,
Hast thou tapped out and drunkenly caroused : "
Richard II., I., ii., 126.

" Judicious punishment ! 't was this flesh begot
Those pelican daughters."
King Lear, III., iv., 74.

" To his good friends thus wide I'll ope my arms ;
And, like the kind life rendering pelican,
Repast them with my blood."
Hamlet, IV., 5, 143.

" Life's self is nourished by its proper pith,
And we are nurtured like a pelican brood."
Keats.

" It is as if the desert bird
Whose beak unlocks her bosom's stream
To still her famished nestlings' scream,
Nor mourns a life to them transferr'd
Should rend her rash devoted breast,
And find them flown her empty nest."
Byron.

" No, thy chains as they rankle, thy blood as it runs,
But make thee more painfully dear to thy sons,
Whose hearts, like the young of the desert-bird's nest,
Drink love in each life-drop that flows from thy breast."
MOORE.

Prof. Alfred Newton, F.R.S., in *A Dictionary of Birds*, says :—

" It may be necessary to state that there is no foundation for the venerable legend of the pelican feeding her young with blood from her own breast, which has given it an important place in ecclesiastical heraldry, except that, as Mr. Bartlett has suggested (*Proc. Zool. Society*, 1869, p. 146), the curious bloody secretion ejected from the mouth of the flamingo may have given rise to the belief, through that bird having been mistaken for the ' pelican of the wilderness.' "

John Timbs, F.S.A., in his *Popular Errors*, p. 104, gives the following note, which agrees with the explanation given in *The Royal Nat. Hist.* :—

" By reference to the actual economy of the pelican, we find that in feeding the nestlings—and the male is said to supply the wants of the female, when she is sitting, in the same manner—the under mandible is pressed against the neck and breast, to assist the bird in disgorging the contents of the capacious pouch ; and during this action the red tail of the upper mandible would appear to come in contact with the breast, thus laying the foundation, in all probability, for the fable that the pelican nourishes her young with her blood, and for the attitude in which the imagination of painters has placed the bird in books of emblems, etc., with the blood spurting from the wounds made by the terminating nail of the upper mandible into the gaping mouths of her offspring."

That this is an old-standing fallacy is seen from the fact that it was referred to by John Skelton, the Poet Laureate, who died in 1529, in the following words :—

" Than sayd the Pellycane,
When my byrdts be slayne,
With my bloude I them reuyue [revive],
Scripture doth record,
The same dyd our Lord,
And rose from deth to lyue."

—*Armoury of Birds.*

The seal of the Equitable Life Assurance Society, founded 1762, has a poor representation of a pelican in the centre with four baby pelicans trying to catch five drops of blood, but one baby is so far under its mother it has little chance of success !

Vide *Notes and Queries*, Apr. 1, 1922, p. 246.

That Humming-birds Feed only on the Nectar of Flowers

" The tongue of the humming-bird consists of two cylindrical tubes, tapering towards the points, and forming two sheaths which contain the extensible portion, and are capable of separation, thereby facilitating the extraction of honey from the nectaries of flowers, and with it what is of far greater importance for the birds' sustenance, the small insects that have been attracted to feed upon the honey.

"The food of the humming-bird consists mainly of insects, more commonly gathered in the manner already described, from the flowers they visit; but, according to Mr. Wallace, there are many species which he has never seen so occupied, and the 'hermits' especially seem to live almost entirely upon the insects which are found on the lower surfaces of leaves, over which they will closely pass their bill, balancing themselves the while vertically in the air. The same excellent observer also remarks that even among the common flower-frequenting species he has found the alimentary canal entirely filled with insects, and very rarely a trace of honey. It is this fact doubtless that has hindered almost all attempts at keeping them in confinement for any length of time—nearly everyone making the experiment having fed his captives only with syrup, which is wholly insufficient as sustenance, and seeing, therefore, the wretched creatures gradually sink into inanition and die of hunger."—Prof. Alf. Newton, F.R.S., in *A Dictionary of Birds.*

Prof. T. Rymer Jones, F.R.S., also says they feed on small flies and insects, as well as nectar.

That Ostriches cannot Jump or Swim, and that they use their Wings as Organs of Flight

Mr. S. C. C. Schreiner, who has had a large experience of South Africa, attacked this fallacy some years ago in the *Zoologist.* He stated that an ostrich can not only leap over a low fence and across a narrow sluit (gulley or ditch), but that it can go over a 5-ft. wall, especially if startled. Also that it can swim, and that in running its wings are not used as in flight, but they have a balancing action, aiding the bird to turn abruptly. It is incorrect to say the cock-bird alone sits, or that during the day the eggs are left to the heat of the sun. The hen sits during the day and the cock at night. Darwin, in his *Voyage of a Naturalist,* p. 190, refers to the use of the wings as sails by the South American ostriches, and the author can confirm this use of them in South Africa. They are not flapped, but are held out sideways when the bird is running.

That the common Goose-teal, or Cotton-teal, cannot Walk or Stand

Mr. Finn's observations on this type of duck were reported briefly in the *University Correspondent* of August 28,

1897. The fallacy, which is said to be common among students of Indian ornithology, has originated from the fact that the bird when disturbed invariably describes a loose shuffling motion over the ground, which cannot be described as either walking or flying. Mr. Finn concluded that the bird is, like other birds, capable of walking, and that the peculiar motion observed is the result of either weakness or fright. Both the illustrations which we have before us show the bird with well-developed legs, and feet like those of the common duck.

That Plovers' Eggs are Laid by the Birds called Plovers

It is passing strange that, though there are at least *thirty-two birds* with double-barrelled names, the second of which is "plover"—*e.g.*, golden-plover, Norfolk-plover, whistling-plover, etc.—it is *not* the eggs of any of these which used to be sold as the well-known delicacy! The so-called "plovers' eggs" are the eggs of the lapwing (*Vanellus cristatus*). The well-known naturalist, the Rev. J. G. Wood, is definite on this point, and so is the *Century Dictionary*, under "plover." To add further to the confusion, the lapwing is also called a peewit. The only connection between the plover and the lapwing is that they both belong to the family *Charadriidæ;* but while the plover is in the genus *Charadrius* (being *Charadrius pluvialis*) the lapwing is in the genus *Vanellus*, a difference sufficiently clear not to warrant the confusion that exists, especially as each of the birds has a simple and well-known vulgar name.

That Birds Sleep with their Heads under their Wings

The nursery rhyme is no doubt largely responsible for this fallacy:—

> "The north wind doth blow,
> And we shall have snow;
> What will cock robin do then, poor thing?
> He'll go to the barn,
> And keep himself warm,
> And put his head under his wing, poor thing."

Birds do turn their heads round and lay them on their backs with their beaks concealed, and sometimes even their heads are nearly hidden, but Dr. Bowdler Sharpe, and Mr.

Clarence Bartlett of the Zoological Society of London, both say the heads are not placed under the wings. Any careful observer may confirm this for himself.

That Robin Red-breasts Sing only in the Autumn

Gilbert White, in *Natural History of Selborne*, gives the explanation of this fallacy. It is because, though the red-breasts sing all through the Spring, Summer and Autumn, their voices are drowned in the general chorus during Spring and Summer, while in the Autumn their song becomes distinguishable.

That Birds Die of Cold

They are often found frozen *after* death in Winter, but cold is not the direct cause of their death. It is, however, frequently the indirect cause of their death, for when the ground is frozen hard or covered with snow the food supply of the birds is partly or even entirely cut off. Mr. C. Nicholson, B.E.A., agrees with this explanation and Mr. Thompson, the head-keeper at the Zoological Gardens, says—*Pearson's Weekly*, May 1, 1897—"No birds have died from cold alone at the Zoo even during the terribly severe Winter of 1894-5."

An authoritative writer (G. W. Murdock) in the *Cornhill Mag.*, for Feb., 1895, stated :—"I have never known a bird in this country or in North America during the terribly severe winter of 1875-76 die of cold, but I have seen hundreds and thousands of birds dying and dead of starvation. . . . No wind direct from the North Pole, over trackless and snow-mantled Greenland or Iceland, ever ruffled the equanimity of a pigeon on the farthest point of Scotland if it were not pinched for food and water.

"I have watched my pigeons during biting hurricanes, perched on the highest ridge of their house, preening their feathers, and literally cooing in the blast with delight. Nor do pigeons, like human beings, grow more sensitive to cold as they advance in years.

"Birds, I believe, never absolutely die of cold. I question if they ever feel it as man does, and I attribute their invulnerability to the closeness and warmth of their feathery covering, the peculiar texture of the skin of their feet and legs, the fatty plumpness of their flesh, the warmth and

richness of their blood, and other purely physiological characteristics."

Mr. W. A. Dutt, author of *Wild Life in East Anglia*, writing on Dec. 22, 1910, said, " Many birds are found dead during sharp frosty weather and when the ground is thickly covered with snow. Their death is due, not to severe cold, but to starvation. When the ground is frozen hard or covered with snow, they have much difficulty in obtaining seeds, worms, grubs, etc." Moral: feed the wild birds in such weather. Much pleasure and instruction may be afforded children by encouraging them to feed wild birds at all times.

" It is the cutting off of the food supply, caused by the long continuance of frost, that kills the birds and starves the hares and rabbits, not the snow itself. Animals, which would be sick and ailing after three days' rain, seem to enjoy a week's snow."—C. J. Cornish, p. 112, *Animals at Work and Play*.

That Birds are Always Happy when Singing

Richard Kearton, F.Z.S., when lecturing to the Rochester Naturalists' Soc. on Oct. 23, 1907, said that if mud were thrown into a bush in which there were a number of birds, they would sing, but that one could not suppose that in the circumstances they were happy!

Mr. C. Nicholson, B.E.A., writing on Nov. 7, 1908, said, " No, the singing is generally considered to be simply rivalry."

That the Wren is the Female of a Robin-redbreast

John Brand in his *Popular Antiquities*, p. 687, gives the proverb :—

" The Robin and the Wren
Are God Almighty's cock and hen,"

but Mr. E. Kay Robinson in his *Religion of Nature*, p. 88, clearly refutes the popular notion.

Cock-robin is a familiar term for the robin redbreast, but as a fact the male and female are closely alike, so that to call all robin redbreasts *cock*-robins is wrong.

That all Birds which Swim Well are Web-footed

There are many British non-webfooted birds that are equally at home on or under the water as are their web-

footed brethren. Amongst others, the Oyster catcher, the spotted Red Shank, the Knot, Green Shank, Sandpiper, Water Crake, and the Dipper. A very well-known bird, the Moor Hen, is another instance of a non-webfooted bird being able to disport itself on the surface of, or beneath, the water, swimming with as much ease and grace as a duck.

That an Ostrich Can Digest Iron

" I'll make thee eat iron like an ostrich, and swallow my sword like a great pin, ere thou and I part."—Henry VI. (2), IV., x., 28.

This fallacy was dealt with by Sir Thomas Browne, M.D. (*Vulgar Errors*, Book III., Chap. 22, pubd. 1646) :— " The common opinion of the Ostrich, Struthiocamelus, or Sparrow Camel, conceives that it digesteth iron, and this is confirmed by the affirmations of many : besides swarms of others, Rhodiginus in his prelections taketh it for granted, Johannes Langius in his epistles pleadeth experiment for it ; the common picture also confirmeth it, which usually describeth this animal with an horseshoe in its mouth. Notwithstanding, upon inquiry we find it very questionable, and the negative seems most reasonably entertained, . . . "

Cuvier says, " It swallows without any choice, and merely as it were for ballast, wood, stones, grass, iron, copper, gold, lime, or in fact any other substance equally hard, indigestible, and deleterious. The powers of digestion in this bird are certainly very great, but their operation is confined to matters of an alimentary character."

Dr. P. Chalmers Mitchell, D.Sc., F.R.S., F.Z.S., 5th ed. of the *Official Guide* to the Gardens, says, " They are vegetable feeders, and will maintain themselves on poor pasture ; in captivity they will devour almost anything, from meat to keys and coins."

The hard indigestible substances are of course taken for the purposes of the gizzard, in the same manner that the common barndoor fowl takes small sharp pebbles.

That Parrots are the only Birds which Talk, and which do not Fly

" Nay, I'll have a starling shall be taught to speak."
Henry IV. (1), I., iii., 221.

" Sir,—It hardly seems possible to have packed so many fallacies into two lines as was accomplished in the ' sentiment ' of Mr. Orville Wright which you quote in the *Westminster*.

The words attributed to him are : ' Parrots are the only birds which speak—and parrots are the only birds which do not fly.' A laudable ' sentiment ' from some points of view, but lamentably inaccurate. Parrots, of course, are *not* the only birds that speak—ravens, magpies, and mynas can all be taught this accomplishment.

" Parrots are *not* the only birds which do not fly. Penguins, ostriches, and emus do not fly, but parrots *do*—quite as far and quite as fast as sparrows.—Yours faithfully,

" STADACONA."

Westminster Gazette, Sept. 1, 1909.

Other birds which can learn to talk are amazons, cockatoos, macaws, and (very rarely) budgerigars, in fact nearly all the parrot family, but the best talkers are usually the red-tailed grey parrots of Africa. Yet other birds which can learn to talk are Crows, jackdaws, ravens, rooks, jays, and magpies.

" SIR,—I have had some experience in teaching a budgerigar (often erroneously called a love-bird) to talk.

" The bird listens most intently when learning a new sentence, which takes about three weeks. The first attempts are indistinct, and care must be taken to give a clear pronunciation. For a time the bird will repeat the new sentence continuously, to the exclusion of all others.

" My budgerigar repeats the following sentences daily :—' Dear Little Frances,' ' Come along, Miss Nash,' ' Come along, Godfrey,' ' Shut the door, please,' ' Naughty boys, late again,' ' Dear little baby girl,' ' Come along, Bingo,' ' You little beauty,' ' Sweet little birdie boy,' and, lastly, ' Poor little me,' which is his own invention.

" Ashleworth Rectory, Gloucester. M. NASH."

Daily Mail, Feb. 1, 1908.

As regards flying, parrots may be seen performing that act very easily any day at the London ' Zoo.'

As to Crows talking, it is recorded (but I do not vouch for the truth of the statement !) that after the victory of Actium a man with a crow approached Augustus, and that the crow (as taught) greeted him with the words, " Hail, Cæsar, Conqueror, Emperor ! " Cæsar bought the bird. Later, another man brought a talking crow to the Emperor who refused to purchase it, whereupon the crow remarked, " I have lost my time and my trouble " (the words used by its owner when he had failed to teach it something else).

This pleased Cæsar more than ever and he bought the second crow at an enhanced price !

" During the Crimean War, in 1854, General Scarlett, who led the Heavy Dragoons in their famous charge at the battle of Inkerman, received from Lord Raglan, the general in command of the English forces, this message : ' Well done, Scarlett.' After the war, Gen. Scarlett returned to Bank Hall, Burnley, and a working man, who had a starling caged, taught the bird to say, ' Well done, Scarlett.' The bird was on exhibition to any curious person who paid the fee of one penny."—W.L.T. in *Notes and Queries*, 11 S. xi., 270, April, 3, 1915.

Other instances of starlings being taught to talk are recorded in *Notes and Queries*, 11 S. xi., 68, 114, 154, 218.

That Flamingoes Sit on their Nests with their Legs Dangling Down

Mr. C. E. Clark, *The Mistakes We Make*, p. 55, " The flamingo before us adorns a book of travellers' tales, and makes himself ridiculous by sitting *à chéval* with one long leg hanging down each side of a high cone-shaped nest. But it were better to know that the nest is nothing more than a *low* pile of weeds and leaves cemented with marl in shallow water, and that the builder sits on its eggs as any other bird, and manages to *fold* its legs under itself.

" To judge properly of the physical impossibility of this or any other bird to bestraddle a nest twice the width of its body, pay a visit to the splendid specimen sitting on its nest at the Cromwell Road branch of the British Museum for the edification of all the world."

Chambers's Encyclopædia :—" The nests are mounds of mud, from 8 to 15 inches in height, gradually raised year after year, and built at distances of 3 to 4 feet apart. During incubation, the females, according to some, sit with their legs dangling down behind ; but Mr. Blake, who watched them carefully, says the limbs are folded under the birds in the usual fashion."

Mr. Clark refers to the beautifully mounted specimens at the Natural History Museum. The label on the large case containing them states, " The round nest of mud, slightly hollowed out on top, is built in shallow water, and raised a few inches above the surface. It is really a foot in

height and the bird, when incubating, doubles up its long legs beneath it."—Mar. 20, 1915.

The legs of flamingoes are nearer to 24 inches long than 12 inches, the height of the nest, so there is no room for the legs to straighten, still less to " dangle." There is the further objection that the bird would probably get cold feet leaving them in the water while " sitting " !

It is not often that a popular fallacy plays a prominent part in a High Court, but this one did, for it gave rise to a libel action by Mr. Harold Hodge, editor of the *Saturday Review*, against Mr. Abel Chapman, joint author of *Unexplored Spain*. The case was heard by Mr. Justice Darling and a special jury in the King's Bench division. A settlement was announced on the second day (June 19, 1912). Mr. Hodge admitted that Mr. Chapman was entitled to the credit of discovering the position in which the flamingo sits on its nest, *i.e.*, that its legs do not dangle down, but are folded up under it in the same manner as when the barn-door fowl sits.

That Sparrow-hawks do not Build their Own Nests

Richard Kearton, F.Z.S., is said to have stated in June, 1906, that sparrow-hawks do build their own nests.

C. Nicholson, M.B.O.U., writing on Nov. 7, 1908, said, " This is nonsense. Probably a cuckoo has been mistaken for a sparrow-hawk."

The *Harmsworth Ency.* states, " The bird usually builds its own nest which is placed in a tree."

W. A. Dutt, writing on Dec. 22, 1910, said, " I believe that sparrow-hawks always build their own nests. I have found several in oak trees, and although I have heard of sparrow-hawks using squirrels' old ' dreys,' I have never met with such a nest."

" It nests in trees, sometimes building a nest of its own, sometimes adopting one deserted by a crow or other bird." —*Chamb. Ency.*, IX., p. 610.

That Blinding a Chaffinch makes it Sing Better

A case was reported in the daily press of Feb. 20, 1912, and in cross-examination, Inspector Sidney Inight, of the Roy. Soc. for the Prevention of Cruelty to Animals, said that the lower classes thought that if a chaffinch were blinded it sang better, and that it was a common practice to blind them.

E. F. King, M.A., *Ten Thousand Wonderful Things*, p. 651. in writing of the *fête du pays* held at Armentières, in France, also refers to this cruel practice.

That Ravens turn their Young out of their Nest before they have learned to provide for their own sustenance

"Apart from its universal association with evil augury, it has always been regarded as a cruel parent, turning its young out of their nest before they have learned to provide for their own sustenance; whereas, no bird existing is more solicitous concerning the welfare of its young than is the raven."—Frank Gibson, p. 19, *Superstitions About Animals.*

"The Raven is almost everywhere regarded with awe by the ignorant even at the present day. . . . The smell of death is so grateful to them that they utter a loud croak of satisfaction instantly on perceiving it. . . ." From this propensity . . . has probably arisen the common notion that he is aware of death's approach among the human race, and foretells it by his croaking."—Rev. C. A. Johns, F.L.S., p. 64, *British Birds in their Haunts.*

That Swans, which scarcely have a note during life, Sing Sweetly when Dying

"*. . . . lamenting, in a low voice, her very woes, as when the swan, now about to die, sings his own funeral dirge.*"—Ovid.

"*'Tis strange that death should sing.*
I am the cygnet to this pale faint swan,
Who chants a doleful hymn to his own death;
And from the organ-pipe of frailty sings
His soul and body to their lasting rest."
King John, V., vii., 20.

"*I will play the song and die in music.*"
Othello, V., ii., 243.

"*Then, if he lose, he makes a swan-like end,*
Fading in music."
Merchant of Venice, III., ii., 43.

"*And now this pale swan in her watery nest*
Begins the sad dirge of her certain ending."
Lucrece, v. 35 from the *end.*

"*There swan-like let me sing and die.*"
Byron.

"*Like some full-breasted swan*
That fluting a wild carol ere her death,
Ruffles her pure cold plume and takes the flood
With swarthy webs."
Tennyson. "The Passing of Arthur."

For a neat sarcastic couplet we have to go to Coleridge, who wrote :—

> *" Swans sing before they die : 'twere no bad thing*
> *Should certain persons die before they sing."*

" The ancients called the swan the Bird of Apollo or of Orpheus, and ascribed to it remarkable musical powers, which it was supposed to exercise particularly when its death approached. The note of the male bird at breeding time is loud and trumpet-like ; the tame bird's note is little more than a hiss."—*Chambers's Ency.*, Vol. IX., p. 827.

" The ancient fable that swans sing most sweetly before their death did not survive the age which invented it. Pliny disbelieved it, and, though the assertion may have been resuscitated from time to time as a poetic fiction, it has found no place in works on natural history.

" The swan is not musical."—*British Birds in their Haunts*, by Rev. C. A. Johns, p. 181.

Pliny in his *History* (X., 23) alludes to this belief and states, on his own observation, that it is not true.

Sir Thomas Browne (*Vulgar Errors*, Vol. I., p. 357) tells us the statement is refuted by Myndius in *Athenœus*, and severely rejected by Scaliger.

Vide *Notes and Queries*, Sept. 9, 1921, p. 237, and " L.G.M." in *Daily Mail*, Oct. 12, 1920.

That an Ostrich, when pursued, hides its head in Sand and thinks that as it cannot see its pursuers, therefore they cannot see it

My experience of ostriches is that *they* are as often as not the pursuers !

" But the veriest fools they be of all others ;—for as high as the rest of their body is, yet if they thrust their head and neck once into any shrub or bush, and get it hidden, they think then they are safe enough, and that no man seeth them."—Holland's Pliny, Book X., ch. 1.

> *" Whole nations, fooled by falsehood, fear or pride,*
> *Their ostrich heads in self-illusion hide."*
>
> Moore.

Mr. C. Du P. Chiappini, Trade Commissoner for South Africa, in an interview reported in the *Daily Graphic*, Oct., 1912, stated that there was little that he did not know about

ostriches, and that they do not burrow their heads in the sand.

That Eagles soar to a great height in order to enjoy a gaze at the Sun in his Unclouded Brilliancy

> *" Nay, if thou be that princely eagle's bird,*
> *Show thy descent by gazing 'gainst the Sun."*
> Henry VI., pt. 3, Act II., Sc. i., l. 91.

> *" Methinks I see her as an eagle mewing her mighty youth, and kindling her undazzled eyes at the full mid-day beam."*—Areopagitica : Milton.

" The fable of the eagle soaring to a great height in order to enjoy a gaze at the Sun in his unclouded brilliancy, is founded probably on a belief of the ancients thus stated by the naturalist Pliny :—' Before it's young are as yet fledged, the Eagle compels them to gaze at the rays of the Sun, and if it observes one to wink or show a watery eye casts it from the nest as a degenerate offspring ; if, on the contrary, it preserves a steady gaze, it is saved from this hard fate, and brought up.' "—C. A. Johns, F.L.S., p. 152, *British Birds in their Haunts* (1910).

That Eagles can see objects on the Ground no matter at what Height they are Soaring

" There seems very little probability that Eagles have the sense of smell very acute, but that their vision is so is evident. I am not, however, inclined to think that they perceive objects from the vast height to which they sometimes soar, because I never saw one descend from such an elevation in a manner indicating that it had observed a carcase or other eatable object ; whereas, on the other hand, I have very frequently seen them flying along the sides of the hills, at a small height, obviously in search of food, in a manner somewhat resembling that of the sparrow-hawk, but with much less rapidity."—Macgillivray ; quoted by the Rev. C. A. Johns, F.L.S., p. 153, *British Birds in their Haunts.*

That Turkeys originally came from Turkey

" The common Turkey, the largest of the gallinaceous birds, well known as an inmate of our poultry-yards, is a

native of North America, where it exists in two forms. . . . It is from *Meleagris mexicana* that our domestic turkeys are descended, the breed having been introduced into Europe in the beginning of the 16th century by a lieutenant of Sebastian Cabot."—*Chambers's Ency.*

Turkeys were brought to London and Bristol by traders who dealt chiefly with the Near East and were hence called "Turkey merchants," while the birds they sold got to be called "turkeys."

The "Turkey" was introduced into South West India by the Portuguese, and the French imported it into France from there, calling it "Poule d'Inde," whence "dinde" and "dindon," the modern French for "turkey-hen" and "turkey-cock," respectively.

"The turkey of our farmyards was originally brought from Cuba, but mates freely with the Continental American species."—C. J. Cornish, p. 229, *Animals at Work and Play.*

That the Beautiful Feathers for which the Peacock is so well known are his Tail Feathers

"And like a peacock sweep along his tail;
We'll pull his plumes and take away his train."
Henry VI. (I.), III., iii., 6.

". . . the most remarkable characteristic of these birds is, that in the male the upper tail-coverts are longer than the quills, and may be elevated when he spreads his tail, the feathers of which are of unequal size, and terminated by numerous brilliant circles of metallic splendour . . . the richness and beauty of which are beyond description."—T. Rymer Jones, F.R.S., *Animal Creation*, p. 337.

". . . the gorgeous train which constitutes its chief ornament is often four feet long, and consists of an extraordinary mass of upper tail-coverts, not true tail-feathers, which latter the train overlies and far outreaches. These tail-coverts are elegantly formed of spray-like decomposed webs enlarged and recomposed at the end, and marked with glittering ocelli or 'eyes.'"—*Century Dict.*, Vol. V., p. 4342.

". . . The long train, with its beautiful 'eye' feathers, is due to the elongation of the wing-coverts, and the true tail quills may be observed beneath."—*Harmsworth Ency.*, Vol. VIII., p. 132.

"The same general scheme of play is seen in the case of the peacock, who spreads his magnificent 'train' around his head and neck (not to be confused with his tail, as it often is); . . . ."—Sir Ray Lankester, F.R.S., in *Daily Telegraph*, April, 7, 1914.

"The peacock is chiefly remarkable from the extraordinary length of his tail-coverts; the tail itself not being much elongated."—Chas. Darwin, *Descent of Man* (1901), p. 655.

That Birds of the Wild Duck family adopt a V-shaped formation in flight in order that the leading bird may break the force of the wind for the rest

"The old-fashioned explanation, that by advancing in a wedge the front bird acted as a kind of pioneer, to break the force of the wind, is, however, probably the exact reverse of the truth. Wind, in moderation, is almost a necessity to the sustained flight of birds, and the probable object of a wedge-formation when advancing against the wind is, that each bird *avoids* the 'wake' of its neighbour, while at the same time the flock has a leader. When the wind blows on the side of the V, it has been noticed that one limb is generally much longer than the other, or that the birds forming one limb occupy positions which coincide with the spaces between the birds on the windward side, and are thus exposed to the wind current. But often with a strong side wind the wedge formation is abandoned altogether, and the ducks fly in single file, though the 'distances' are always accurately kept."—C. J. Cornish, p. 54, *Animals at Work and Play*.

Although Mr. Cornish wrote the foregoing in 1896, or earlier, when the science and practice of aviation had not started, we now know that his explanation is correct and that aviators often adopt a similar formation.

That the Scarlet Ibis was the one which the ancient Egyptians used to Worship

Both the scarlet and white ibis used to be kept in the same place at the 'Zoo,' and just as a soldier in a scarlet uniform attracts more attention than a mere civilian in ordinary dress, so the scarlet ibis is thought to be the more important of the two, but it was the less showy black and

white ibis (*Ibis æthiopica*) which used to be worshipped by the ancient Egyptians. This bird is no longer found in Egypt, though it is plentiful on the Upper Nile. The scarlet ibis (*Eudocimus ruber*) is confined to America.

Prof. T. Rymer Jones, F.R.S., speaks of the sacred ibis as *Ibis religiosa* and says it was educated in the temples of the Egyptians, and embalmed after its death. " It seems to have been an object of religious worship on account of its habit of devouring serpents, or, perhaps, because its appearance was generally simultaneous with the overflow of the Nile, to which that country owes so much of its fertility."

That Kestrels Kill Game

Mr. C. J. Cornish in *Animals at Work and Play* (p. 277) refers to the " Report of the Committee, appointed by the Board of Agriculture, to inquire into the plague of field voles in Scotland." (p. 279) " Next to the owl, and hardly second in merit, as a check upon voles and mice, comes the Kestrel. Yet its death warrant is a standing order in most preserves, and the Committee feel so strongly on the subject, that the following portions of a keeper's evidence are embodied in their Report :—

" ' Why did you kill the kestrel ? Well, it was an enemy of the game, of course, and that is why I killed it. How often have you seen a kestrel take game ? Many a time. What kind of game ? Young pheasants. Had you many young pheasants at West Buccleuch ? No. Then why did you kill the kestrel ? Because they will kill young grouse. Did you ever see them take young grouse ? No. Did anybody of your acquaintance ever see them take young grouse ? No ; but I have heard of their taking young grouse. Would you believe a man if he said that he saw a kestrel taking young grouse ? Yes, if he said it I would. Any man ? Yes, if he was not drunk.'

" Against this may be set the evidence of the headkeeper at Drumlanrig, where kestrels, as well as owls, are preserved by order of the Duke of Buccleuch, that in his experience of over 30 years he thought that he could only remember twice seeing a kestrel take a young pheasant."

p. 282, " But now that a competent and impartial tribunal has pronounced for the complete protection of the owl, the kestrel, and the buzzard, and the smaller seagulls, it is not too much to hope that a clause may be added to the Wild

Birds' Protection Act, which may preserve them, not only in certain months, or in particular districts, but at all times and in all countries of the Kingdom."

That Love-Birds frequently Die of Grief on the Loss of their Mate

"Birds . . . . which have always shown the utmost distress at the loss of their nestlings, seem seldom affected to sorrow by any other circumstance, though Miss Benson, in her book, *Subject to Vanity*, has lately given an account of the 'inhuman' indifference of a hen Budgerigar parrakeet when its mate was ill, and of the obvious dejection which this indifference caused in the sick bird. But it is now doubted whether 'love-birds' die of grief after the loss of their mate though the fact that one usually dies very soon, often only a few hours after the other, is not disputed. But they are delicate birds, and the same unsuitable food or sudden draught which kills one usually affects the other. They are probably victims, not of sorrow, but of errors in 'domestic hygiene.'"—C. J. Cornish, *Animals at Work and Play*, p. 84.

A commercial naturalist said that love birds are the most pugnacious birds alive.

That the Carrier Pigeon is the Breed that is now used for Bearing Messages

"You are right and yet wrong. The original carrier used to carry messages, but the fancy has so developed it that it is now too large and too heavily wattled to be good for anything except the show bench. The bird used now is a pigeon called the 'Homer.' I see in an old pigeon book that the Homer was developed by crossing the owl with our English Dragon, or the long-flighted Beard with the English Dragon and putting their young back to the Owl. These birds were bred in Belgium.

"The Dragon or Dragoon, a bastard strain by crossing a Horseman and Tumbler, and by matching their breed often to the Horseman. The Horseman again was originated by a cross between a Tumbler and Carrier, or Carrier and Pouter, and crossed back again to the Carrier.

"The original Carrier came from Bazora in Persia and were called by the people Baffories. The Dutch called them Bagadat, a corruption of Bagdad.

"In Turkey they called them Bagatius or Couriers. The Turks and Persians made a common practice of breeding these pigeons in their seraglios.

"Every Bagshaw (some notable I presume) generally had some of these pigeons sent him from the grand seraglio. In case of insurrection or other urgent occasion, he braces a letter under the pigeon's wing, turns it loose, but for fear of their being shot, or struck by a hawk, they generally despatched 5 or 6. In the old days they could carry a letter from Babylon to Aleppo, a 30 days' journey by road, in 48 hours.

"The City of Ptolemais besieged by French and Venetians was saved by the arrival of a carrier pigeon bringing a message to say that the Sultan was coming with an army and would arrive in 3 days. The pigeon fell down into the City. The Christians, after reading the letter, sent away the pigeon, which had recovered itself, with a letter to the effect that they should see to their safety, for that the Sultan has such important affairs that it renders it impossible for him to come to their relief. Upon the reception of this letter the city was immediately surrendered to the Christians. After the three days the Sultan arrived, but finding how matters stood, returned again with his army.

"Ovid, says Taurosthenes, by a pigeon stained purple gave notice of his victory at the Olympic games to his father at Ægina.

"Hiritius and Brutus at the siege of Modena informed each other by pigeon post; and so on even to the siege of Paris."

S. A. Clarke, L.R.C.P., writing on March 13, 1915.

Mr. C. E. Clark, p. 109, *More Mistakes We Make* (1901), points out that a carrier pigeon does *not* "possess some mysterious instinct which enables it to fly straight home when released at a long distance. This is all nonsense. The homing pigeon has to be most carefully trained, first by being thrown up at the four points of the compass at a short distance from its loft, ... then by flights only gradually increased."

That Starlings Eat Seeds

At p. 41 of *Rambles in the Park*, by W. J. Claxton, we read, "Many people think that starlings eat seeds, peas, beans, and so on, but this is a great mistake. Why, they are some of

the best friends I have ! " While in *Leaflet No. 45* of Feb., 1911 (which is devoted to the Starling) issued by the Board of Agriculture and Fisheries, we read : " Starlings have increased very markedly of late years. This is due partly to the protection which they enjoy, and partly to their power of rapidly moving from place to place according to the abundance or scarcity of food . . . .

" The Starling is of much benefit to agriculturists, as its food consists principally of worms, snails, and insects in their different stages. It is especially useful in clearing off chafer larvæ, and other larvæ of the same habits, in meadows and pastures, and surface caterpillars in turnip and mangold fields. The destructive larvæ of the Antler moth, the Diamond Back moth, the Silvery Y moth, and of other moths, as well as those of the Daddy Longlegs, and of the Click Beetle (known as wire worms), are also eagerly devoured by this bird. In the late Autumn and Winter, when the Starlings congregate in flocks, they clear whole fields of injurious insects in larval or pupal form, and their sharp eyes detect the eggs of at least the larger insects upon forest and orchard trees. The insects that hibernate in the larval or pupal form upon fruit and other trees are, without doubt, picked out of their Winter quarters by the long, pointed beaks of these sharp-eyed restless birds.

" During the year 1904 many complaints were made of the depredations of Starlings, not only in the Kentish cherry orchards, but in apple and pear orchards and in connection with other fruit. Wheat has also been frequently attacked . . . . "

In the ' Summary ' it is stated, " There is no doubt that starlings do much harm in the orchards of this country when the fruit is ripening. On the whole, however, the information at present collected goes to show that, in view of their great partiality for insect food, Starlings are, from the forest standpoint, entirely useful, whilst in agriculture and gardening their usefulness far more than outweighs the occasional harm done."

It will be noticed that ' wheat ' is the only kind of seed mentioned. As an additional feather in their cap (or star on their breast !) the author would like to add, that he has some red currant bushes in his garden (Hampstead Garden Suburb) and was greatly concerned about the Starlings, of which 20 is not an uncommon number to see on the lawn

at a time, but after four currant seasons he is glad to be able to state that not a single berry has been missed. The bushes were not protected in any way.

That Birds Usually Sleep in their Nests

" Many boys and girls think that birds sleep in their nests. This is quite a mistake ; they are much too cleanly in their habits for that. Of course, the mother bird *may* drop off to sleep while she is sitting on her eggs, for it is rather a long and tiresome task, is it not ? "—W. J. Claxton, p. 12, *Rambles in the Park.*

That Australian Cormorants Eat large quantities of Food Fishes

MM. S. A. White and A. M. Morgan, two Australian ornithologists, examined the stomachs of a number of Cormorants and reported the results in *The Emu*, Jan., 1919. They show conclusively that the charges against these birds are absolutely without foundation. No food-fishes were found, and only specimens of slow moving fish haunting weedy places, where their capture was easy.

That Osprey Feathers, used for decorating hats, are obtained from Birds of that name

There is a bird of prey of medium size, and with a hooked beak, called an osprey, but no ornamental feathers are obtained from it, its chief contribution to beauty being its eggs. The so-called osprey feathers are obtained from the egret, a species of heron.

The author remembers seeing a kinematograph of the osprey feather industry, which, though vastly more instructive than the usual ' film,' was revolting. It is a pity it is not more frequently shown. If it were, the motherly instinct of the fair sex would surely soon determine them never to wear another spray of osprey feathers.

The special feathers grow on the backs of the birds only during the breeding season, and hence the particular cruelty.

The following letter from Mr. M. F. Clifton, Hon. Local Secretary of the Roy. Soc. for the Protection of Birds for Romford, appeared in the *Daily Mail*, Aug. 6, 1908 :—

" Sir,—Your correspondent on the subject of the Plumage Prohibition Bill enters the lists rather late in the day.

" ' Osprey ' is a name fertile in falsehood, since the bird really bearing the title is a fishing hawk, while the white

egret produces the feathers styled 'osprey' in the trade; but the manner of obtaining this plumage has been too thoroughly exposed by disinterested testimony to be any longer defended by random statements to the contrary.

"The well-known naturalist Mr. W. H. Hudson, after noting that these 'aigrettes' are the ornaments of the egret or white heron, grown only in its breeding season, describes how the feathers are obtained. The hunter chooses his time when the young birds are fledged but unable to fly, because then the parent birds will not go far from their nests, and it is easy to shoot them down; whether the bird is dead, or whether the plumage is torn from its living body, matters nothing; the slaughtered egrets are left to fester in the sun, in sight of their young, who are left to perish of starvation."

That Pheasants' Food consists largely of Mangel-Wurzels

See the *Report on Agricultural Damage by Vermin and Birds in the Counties of Norfolk and Oxfordshire in 1916*, by Dr. R. T. Gunther. Mr. Walter E. Collinge in reviewing this report at p. 48 of *Nature*, Mar. 21, 1918, said:—

"The only really valuable item in the whole report is that with reference to the pheasant, and, curiously, this is largely based on the careful investigations of a member of the Cambridge University School of Agriculture, Miss A. F. C.-H. Evershed. The much-maligned pheasant does not support existence upon a diet of mangels, in spite of weighty statements to the contrary. Miss Evershed and others have shown that unless excessive numbers of birds are kept upon a small area, it is distinctly beneficial to agriculture. Dr. Gunther directs attention to the fact that on some estates where many pheasants are reared there is an absence of wireworm, whereas on others where there are no pheasants, wireworm is found in abundance."

And from the *Harmsworth Ency.*, we learn that their natural food is grain, berries, seeds, snails and insects.

That it is a Common Practice among Bird Fanciers in England to Pierce the Eyes of Birds with Red-hot Needles in order to make them Sing

It affords us much satisfaction to be able to refute so horrible a practice. Mr. Clark, p. 111, *More Mistakes We Make* (1901), quotes the following statement of "the late superintendent of the collection of the Zoological Society:

'I have been acquainted all my life with most of the bird fanciers and bird catchers in England, and I can say, without fear of contradiction, that no such practice does, or ever did exist, and that birds thus treated would die.'"

Mr. Donald Gunn wrote on Sept. 25, 1919, and said:—"The method, so I have heard, was to sear the eyes with a red hot wire or needle, and I see no reason to doubt the practice in face of the surviving tradition. Nor do I suppose a person so dully cruel as to keep a wild bird in a cage would feel any compunction in performing so barbarous an act. But with the steady growth of humanity towards animals, it has probably ceased—at any rate in this country, and no bird fancier, except possibly in Italy, would be so shameless as to confess to the practice.

"Apart from its inhumanity, its stupidity is obvious enough: for, however well the bird sang, proof that its song had been improved thereby would be wanting. More than that, nothing more than an impairment of the sight would be practicable; for a blind bird would promptly starve to death. It could not find its food, for having no hands it cannot 'grope' its way, and to hop in the dark is impossible—it would sit still and die."

That Owls, when on a Perch or Branch of a Tree, place three Toes in front and one behind

Most birds perch with three toes in front and one behind, but owls place two in front, as may be clearly seen in the excellent reproduction of a photo, by W. P. Dando, F.Z.S., at p. 86 of the 5th ed. of the *Illustrated Official Guide to the London Zoological Society's Gardens in Regent's Park* (1907). This being from a photo is more satisfactory than a drawing, but there is such a drawing, opposite p. 144 of *British Birds* (1910), by the Rev. C. A. Johns, showing two toes in front in the case of the owl which is perching.

In the text of the *Official Guide*, too, Dr. Chalmers Mitchell, D.Sc., F.R.S., says, "The Owls, unlike all other birds of prey, perch with the outer toe turned backwards, and the hind toe and claw are conspicuously small."

That Owls Avoid Daylight

Dr. P. Chalmers Mitchell, M.A., D.Sc., F.R.S., at p. 85 of the *Official Guide* to the London 'Zoo' (1907) says of the owls at the 'Zoo,' "The owls have the opportunity of retiring

to shelter, but notwithstanding the popular belief, they pass most of the time in full exposure to light, and are specially fond of sunning themselves."

One Summer the author saw an owl sitting in full view, and face outwards, in a hole in a tall tree at the entrance to Golder's Hill Park, Hampstead; and in Egypt, in 1913, he saw a couple of owls in an ancient ruin in a particularly bright light, as there was no roof to the building.

That Parrots Learn to Talk sooner when kept in a Small Cage

This is one of the harmful or cruel fallacies which is refuted at p. 268 of the *Boy's Own Book* (1852), where it goes on to say, " On the contrary, it can scarcely be too large, and the more room that is given to the bird, the more likely will it be to thrive and do well."

That Quails migrate from Asia Minor to England for the Summer

They migrate from Africa in the Spring to Europe including England, and return from England to Africa in September, though some few remain in England through the Winter.

That if the Sparrow take possession of the Nest of a House-Martin, a number of House-Martins will revenge the act by walling up their enemy alive and leaving her to die in the Nest she has violated

Prof. Alfred Newton, F.R.S., refutes this in his *Dictionary of Birds*, 4th ed.

W. B. Tegetmeier, the veteran naturalist, does not credit the story.

Mr. Donald Gunn wrote as follows on Sept. 25, 1919 :— " One of those stories from the bad period when we read human motives and emotions into the actions of the lower animals. I remember an elaborate illustration in one of my childhood's books from a drawing, I believe, by Harrison Weir of Martins walling up a sparrow—the last person to submit quietly to such treatment.

" The instinct of any bird would be—

" 1. To defend its nest if possible.

" 2. To replace it as soon as possible, if lost.

" Yarrell in his *British Birds*, says, ' The story is a very old one . . . but, though instances of Sparrows turning

out Martins occur every year, evidence of the revenge said to be taken is most unsatisfactory. It is generally offered without even the slight corroboration that would be afforded by information as to the place or observer—and the last, from the language used, would seldom seem to have been a naturalist.'

"I only wish it were true, for then this particular strain of burglar-sparrow would be surely weeded out, instead of surviving to rear parasitic broods to hand on the bad traditions. Martins in England seem in a fair way to be exterminated by the sparrow."

That Hens must have Carbonate of Lime in their Food

In a review of Fabre's *Story-Book of Birds and Beasts* in *Nature*, July 22, 1920, it was stated that "The story of the making of the shell of the egg is misleading, and it is not true to say that a hen *must* have carbonate of lime in her food."

That Parrots naturally inhabit only Tropical Countries

"The home of the vast majority of Parrot-forms is unquestionably within the tropics, but the popular belief that parrots are tropical birds only is a great mistake. In North America the Carolina Parakeet at the beginning of the 19th century used to range in Summer as high as the shores of Lakes Erie and Ontario—a latitude equal to that of the South of France."—*Ency. Brit.*, XVIII., 322.

Another parrot fallacy appears at p. 321, *ibid.*: "Aristotle is commonly supposed to be the first author who mentions a Parrot, but this is an error, for nearly a century earlier Ctesias" did so.

FALLACIES CONNECTED WITH THE ANIMAL KINGDOM.

(c) INSECTS

That a Small House-fly is a House-fly that is not full grown, and hence if it lives that it will grow Larger

The house-fly belongs to the division *Diptera* [Gr. two wings] of insects, and all insects in this group and some other groups, such as *Hymenoptera* (bees and wasps) and

Lepidoptera [Gr. scaly-wings], which includes butterflies and moths, emerge full-grown from the pupa or chrysalis stage, though, of course, in the case of large moths their wings are a bit crumpled at first.

The life-history of the silkworm moth (*Bombyx mori*) may be taken as typical of the life-histories of the above groups: the eggs laid by the female moth on mulberry leaves produce minute black silk-worms (technically known as larvæ), which immediately start feeding on the mulberry leaves. This lasts from six to eight weeks, and they shed their skins several times during the process. When full-grown they are about two inches long, and of a dirty green colour. They then spin their cocoons, enveloping themselves in the silk, the length of the fibre being about 1,500 ft. All moths do not have a fibrous covering, but a brown chitenous one, during their quiescent or pupa stage, and some pupa have no covering. Thus the worm, if *not* trodden upon, will turn into a full-grown moth, which lays eggs, and so we have the complete cycle consisting of four stages or acts.

That Cuckoo-spit is produced by the Cuckoo

Cuckoo-spit is the white frothy exudation, for the purposes of protection, of the larvæ of the *Aphrophora spumaria*, or, according to Brockett, the *Tellicona spumaria*, which is seen at the axillæ of the leaves and branches of plants, particularly lavender and rosemary, early in the spring.

Frog-spit and toad-spit are other names for this spume; frog-spit, because the insect which develops from the larvæ is called the frog-hopper, as it resembles a frog in colour and shape, and hops well, though, of course, it is *not* a frog, but a true insect.

That Soy is made from "Black-beetles"

"Sailors have a notion that soy [a kind of sauce prepared in the East from the soy-bean (*Soja hispida*)] is made from cockroaches; and, however absurd the belief may appear, the reason for it is worthy of investigation.

"The Chinese at Canton have a large soy manufactory, and they are particularly solicitous to obtain cockroaches from ships, from which circumstance sailors immediately conclude that it is for the purpose of making soy from them. But it is better established that cockroaches are used by

the Chinese as a bait in fishing. The infusion of cockroaches is also used in medicine, and Mr. Webster, surgeon of H.M.S. *Chanticleer*, states that common salt and water, saturated with the juices of the cockroach, has all the odour, and some of the flavour and qualities, of soy; so that the sailors' notion, after all, may not be far from the truth."—J. Timbs, F.S.A., *Popular Errors*.

"SIR,—Will you allow me to say a word upon the extraordinarily interesting article in your issue of to-day upon the wonder-working soya bean?

"In these days, when each one of us is concerned to get the greatest possible return in nourishment from the least possible outlay of cash upon food-stuffs, I think it ought to be far more widely known than it is that soya flour—a staple food in the Far East these 2,000 years and more—is among the most highly nutrient products that the earth brings forth. Soya flour is actually higher in protein value than the germ of wheat. Without suggesting any revolutionary changes in our national dietary—which even the hardened cynic will allow might be improved upon—I think all those in general who have the national welfare at heart, and in particular all thrifty housewives, might well ponder upon the following merits, all fully proven, of soya.

"An admixture of 5 to 10 per cent. of soya flour to our ordinary wheaten flour, baked in the customary manner, raises the nutritive value of the loaf from 10 to 25 per cent. above that of any bread—including wholemeal—ordinarily consumed by our British public. The soya bread is also delicious, most digestible, and retains its moisture far longer than our normal breads. I speak from first-hand experience."

"H. C. M."

Daily Mail, Dec. 15, 1915.

That Caterpillars will Eat any kind of Green Stuff

The people who started this belief must be those who fitted green spectacles to their horses, and then gave them wood shavings and straw to eat! Our entomological adviser informs us that while some larvæ, as they are technically called, will eat one or two kinds of green stuff [*e.g.*, those of the Privet Hawk Moth (*Sphinx ligustri*) will feed on both privet and lilac, and those of the Clifden Nonpareil (*Catocala fraxini*) on ash and poplar leaves], many, in the natural state, will feed only on one, as is the case with the larvæ of the

Peacock butterfly (*Vanessa io*) which feeds on stinging nettle only ; White Admiral butterfly (*Limenitis sibylla*) which feeds on honeysuckle only ; Dark Crimson Underwing butterfly (*Catocala sponsa*) which feeds on oak only ; Light Crimson Underwing butterfly (*Catocala promissa*) which feeds on oak only ; Small Emerald moth (*Iodis vernaxia*) which feeds on wild clematis only. It is remarkable that one species, the scarce Merveil-du-Jour (*Diphthera Orion*), is found only on birch one year, and the larvæ that next follow in the cycle of life-changes are found only on oak. Then the *third* series of larvæ completes the food cycle, for they will be found only on birch.

That "Black-beetles" are Black, and that they are Beetles

This is discomforting, and we may expect to hear that negroes are not black, that buttercups do not make butter, nor grasshoppers grass, and that, as some audaciously hint—even the Prince of Darkness himself is not as black as he is painted.

The other vulgar name of the "black-beetle" is cockroach, though we believe cockroaches are unconnected with the fishroach ! Their technical name is *Periplaneta* (from their nocturnal habits). They are both of a dark brown colour, and not true beetles (*Coleoptera*), but belong to a less modified group of insects, including locusts and grasshoppers, known as *Orthoptera*.

That Dragon-flies Sting

In this case we were almost going to give what has been unkindly—and in many cases wrongly—termed "a woman's reason," by saying, "They don't sting because they don't sting." But we will relent. Once, when Henry IV. of France was paying a visit to a small provincial town, he was met at the gates by the civic authorities, the chief of whom stated that they had omitted to fire a royal salute for a hundred excellent reasons, the first being that their town did not possess any cannon. His Majesty was so satisfied with the first reason that he excused them stating the remaining ninety-nine. No doubt there are a hundred good reasons why the dragon-fly does not sting, but we hope our readers will follow the royal example and be satisfied with the first, viz., that the dragon-fly *has no sting*.

The dragon-fly (*Libellula*) belongs to the order *Neuroptera*, and none of the insects of this order has any sting.

John Phin (*Seven Follies of Science*, 2nd ed., 1911, p. 210), states that, " . . . the dragon-fly lives entirely on flies, mosquitoes, and other insects which it captures on the wing, and when a room is so fortunate as to have a dragon-fly for a visitor, all mosquitoes and flies are quickly removed."

Another name for the dragon-fly is " flying-adder " and an adder is very poisonous: this may be how the error has arisen.

That Bees have Tubular Probosces, carry Honey on their Legs and collect Beeswax from Flowers

The following is an extract from the article in *Ency. Brit.*, by John Hunter, late Hon. Sec. of the British Bee-Keepers' Association :—

" The proboscis or trunk of the honey-bee is not tubular, as Swammerdam had supposed, but solid throughout, and the minute depression at its extremity is not the aperture of any canal through which liquids can be absorbed. The proboscis of the bee performs strictly the office of a tongue, not that of a tube for suction ; for when it takes up honey, or any other fluid aliment, the under or upper surfaces are more immediately applied to it, and rolled from side to side, and the bee thus licks up what adheres to it, while the extremity of the proboscis is frequently not applied at all to the substance taken up.

" The bee has two stomachs. The first is a large transparent membranous bag, pointed in front and swelling out into two pouches behind. It performs an office in some respects analogous to that of the crop in birds ; for it receives and retains for a time the fluid of the nectaries, which does not appear to differ in any respect from honey. The coats of this reservoir are muscular, which means it is capable of throwing up the honey into the mouth, so that it is regurgitated into the honey-cells, or imparted to other bees.

" The second stomach is for the purpose of digestion.

" The bees, by means of the pencil of hair which grows on the tarsi, first collect a certain quantity of pollen, and then knead it together into a ball, and place it in the space situated at the middle joint or tibia of the hinder leg, which has been called the basket."

With regard to the wax, Dr. E. Lankester, M.D., F.R.S., says: "It is an erroneous notion to suppose that the bee collects wax from flowers. It is secreted, and makes its appearance in little scales, which exude between the segments on the under side of the abdomen, eight scales being visible in each bee."

The error has probably arisen by confusing bee-bread with beeswax. Bees collect pollen from flowers, and work it up into a stiff paste with their hind legs. This is then called bee-bread, because it is used by the bees to feed their larvæ.

Shakespeare went wrong on the habits of bees, for in the Second Part of *King Henry IV.*, act. iv., sc. 4, we find the King saying:—

> *"When, like the bee, culling from every flower*
> *The virtuous sweets;*
> *Our thighs pack'd with wax, our mouths with honey,*
> *We bring it to the hive."*

See also *Ants, Bees, and Wasps*, by Lord Avebury, F.R.S.

That the May-fly's total Life lasts only one Day

Prof. T. Rymer Jones, F.R.S., says:—"These insects have received their name (*Ephemera*) from the shortness of their existence in their perfect state, which is, indeed, so brief that the same evening sun which sees their birth generally witnesses their destruction. Their life, however, in the earlier stages of their growth is of much longer duration. In their larval state they live in the water, lurking under stones, or residing in little holes that they excavate in the banks of the stream. When about to undergo their last transformation they leave the water, and cast off their pupa covering; but, by a remarkable exception to other insects, they are still covered by a thin pellicle, which gives them a dull appearance. In this condition they are known to the angler as '*duns*' In a short time, however, they cast off this temporary *déshabille*, leaving it upon trees or walls, or even the clothes of the passer-by, and present themselves in the full livery of the perfect insect, in which garb they constitute the '*drake*' of the fly-fisher."

"The May-fly," says Lord Avebury, F.R.S., "is celebrated as living only for a day, and has given its name to all things short-lived. The statement usually made is,

indeed, very misleading, for in its larval condition the *Ephemera* lives for weeks."—*Beauties of Nature*, p. 57.

It may be that the expression " lives only for a day " is sometimes used in a loose way by people who *do* know the true state of affairs ; but this being heard by others whose entomological knowledge is limited, would be repeated by them in an entirely erroneous manner, and thus popular fallacies arise. Moral : Do not use loose, indefinite, and ambiguous language ! In this case some entomologist is to blame, for the Greek word *ephemeros* means " living but a day."

That Earwigs have a particular predilection for getting into the Ears of Human Beings

" Earwig, a name sanctioned by common error, applied under various modifications in different languages (*e.g.*, Auricularia, Perce-oreille, Ohr-wurm, Oorblazer, Ormask, Oerentvist, Gusano del oido) to the somewhat osculant insects comprised in the old Linnæan genus *Forficula*—an error arising in the first instance probably from their invariable habit of secreting themselves in any cavity (instances being known of the common species hiding itself in the ear of a person sleeping in the open air), and strengthened by the popular exaggerated idea of the strength attributes of the anal forceps peculiar to these insects.

" The most common species is *Forficula auricularia*.

" The forceps have been observed to be used in arranging the wings, and are also supposed to be used as weapons of offence and defence, though it is difficult to understand how they can be any practical assistance for either purpose."—Ed. Caldwell Rye, *Ency. Brit.*

The derivation of the word is doubtful ; some say it is from the shape of the wings when they are open. " J.R.S.C.," in *Chatterbox*, No. xxiii., for 1894, says he has never known one get into the ear, although he has had acquaintance with thousands of earwigs.

Lastly, the fact that the majority of earwigs are, in the normal state, certainly eaters of *vegetable* matter, makes it unlikely that they would by preference house themselves in an animal's (man's) ear, especially as the ear contains bitter wax, for the purpose of repelling insects which may get in by chance.

Dr. Brewer says the insect received its name because

the hind wings resemble in shape the human ear, and that the name has engendered the notion that these insects are apt to get into our ears.

That Freezing Kills all forms of Insect Life

Mr. S. L. Mosley, of the Huddersfield Museum, said that any caterpillar which normally passes the winter can be frozen hard and live. Miss Ormerod had some daddy-long-legs' grubs frozen at Kew till they would break, and those not broken lived.

Still less can all forms of bacteria be killed by a low temperature, though it is sometimes erroneously thought that frozen meat must be sterile. Sir James Dewar, F.R.S., performed some experiments at the Friday evening discourse Jan. 21, 1910, at the Royal Institution, to show that micro-organisms cannot be killed even by intense cold.

There was a humorous picture in *Punch*, or a similar paper, about 1885, when the subject of frozen meat was first before the public. The statement was that even human beings might be frozen without harm, and that this would be a convenient way of dealing with children on a railway journey. The picture represented a family leaving by train for the seaside, and Paterfamilias says to the nurse : " Have you seen all the luggage into the van ? " " Yes, sir." " And are all the children frozen ? " " Yes, sir."

That the " Ants' Eggs " with which Gold Fish are Fed are the Eggs of Ants

It is true boa-constrictors swallow animals much larger in cross section than their own bodies, still, for all this, the fact that these so-called ants' eggs are as large as most ants should make us pause to inquire how so small a creature comes to lay an egg as large as itself ; and, if it were true, it would well repay some patient experimental biologist to put the common barndoor hen through a similar course of training !

The life-history of ants is somewhat similar to that of silk-worms, and is still more like that of social bees and social wasps. Starting from the true egg (which is very small) it, on being hatched, yields a tiny grub. This is nursed and fed by the neuters, which form the majority of the inhabitants of a nest. After attaining full size, the

grub spins a white cocoon around itself and changes into a pupa. It is these pupæ in white cocoons which are sold as ants' "eggs." The pupæ in the natural course of events change into full-grown ants. The females of these lay eggs, and thus the cycle is completed.

That the Common House-fly has Suckers at the Extremities of its Legs which enable it to Walk on a Ceiling

It has been said that no house should be without a microscope. Those who have such an interesting and instructive instrument can easily check the fallacy for themselves, others will need to see an enlarged drawing of a domestic fly. One such is given under "house-fly" in the *Century Dictionary*. By either of these methods it will be seen that each foot is formed of a pair of hooks and a pair of pads (*pulvilli*). The latter are covered with microscopic 'hairs' at the end of each of which is a particle of a viscous fluid, thus enabling the fly to adhere to any smooth surface, while the hooks are used for rough surfaces.

Even the celebrated Dr. Dionysius Lardner, F.R.S. (*Popular Physics*,—"The Atmosphere," p. 106), fell into this error, for he wrote, "Their feet are provided with an apparatus similar exactly to the leather applied to the stone."

Mr. Oswald Latter states that, "the feet do not act as sucking discs like the familiar india-rubber contrivance for fastening a candle to the window of a railway carriage, for it has been shown by experiment that their adhesive power is in no way impaired by the removal of atmospheric pressure."

For further information see p. 51 of *The Earthworm and Common House-fly*, by J. Samuelson; *The House-fly* (1914), by C. Gordon Hewitt, D.Sc., F.R.S.C.; *Our Household Insects*, by E. A. Butler, and the model (28 times natural size) in the Central Hall of the Natural History Museum, South Kensington.

That the Locusts referred to by St. Mark, in chap. i., v. 6, were the Bean-pods of the Locust Tree

The quotation is, " . . . . and did eat locusts and wild honey." *St. Matthew*, chap. iii., v. 4, says, " . . . . and his food was locusts and wild honey." That the insects locusts are meant receives support from *Leviticus*, chap. xi., v. 21 and 22, where we read, "Yet these may ye eat of all

winged creeping things that go upon all four, which have legs above their feet, to leap withal upon the earth; even these of them ye may eat; the locust after its kind, and the bald locust after its kind, and the cricket after its kind, and the grasshopper after its kind." The larger Old World species form articles of food with certain semi-civilized and savage races, by whom they are considered as delicacies, or as part of ordinary diet, according to the race and the method of preparation.

John Timbs, F.S.A., says they are still eaten in the East, being dried, salted, ground into a powder and made into cakes. The yellow ones, which are common in South Africa, when boiled turn red and taste somewhat like shrimps. They are eaten also by the Hottentots (South Africa), and Dr. Livingstone approved of them as an article of diet.

Mr. Bijaykumár Gánguli, B.A., Deputy Magistrate of Hooghly, Bengal, writes, " In India, as far as I know, locusts are not eaten in the way described. In Bengal the locusts may be eaten by the aborigines living in hill tracts, but not by the Hindus and the Mehammedans on the plains. A high caste Hindu gentleman told me, however, that he had once eaten locusts fried in clarified butter and found them delicious. He was curious to know how it tasted."

There is nothing in the notes of the *Oxford Bible* to suggest that " locusts " does not mean the insects.

That Gnats and Mosquitoes are Imported largely into Great Britain by means of Bananas

" Marshy pools and water-butts are the breeding-grounds for gnats. Look on the surface of the water and you can see their egg-boats floating about—little brownish-black objects of about the size and shape of caraway seeds, each composed of two or three hundred skittle-shaped eggs fastened side by side together. Look down into the water below and you will see hundreds of the grubs which hatch out from these eggs—quaint little creatures with tufted tails, which wriggle their way along by doubling themselves up and stretching themselves out over and over again.

" They are scavengers to some extent, for they feed on the decaying scraps of animal and vegetable matter which are floating about in the water. After passing through a chrysalis state, the skin of each splits along the back, and a perfect gnat creeps out and stands upon its own cast skin while its

little crumpled wings are slowly spreading and drying. Look on the surface of the water once more and you will see numbers of these empty skins, from each of which a gnat has recently emerged.

" People blame bananas sometimes for the introduction of these gnat-hordes or ' mosquito-hordes ' into this country. But do not blame the bananas ; blame the water-butts. If only those who possess rain-water butts would keep them closely covered, we should hear little of ' great clouds of gnats ' in this country—except perhaps, in low-lying places like Earlsfield."—Theodore Wood, F.E.S., in the *Daily Mail*, Sept. 22, 1908.

That English Ants store Food in the Summer for use in the Winter

" We'll set thee to school to an ant, to teach thee there's no labouring in the Winter."—King Lear, II., iv., 56.

" Our English ants do not store up provision for the Winter ; indeed, their food is not of a nature which would admit of this. I have indeed observed that the small brown ant sometimes carries seeds of the violet into its nest, but for what purpose is not clear. Some of the southern ants, however, lay up stores of grain."—Sir John Lubbock, Bt., F.R.S., p. 26, *Ants, Bees, and Wasps*.

" Among the many mistakes prevalent in regard to the habits of animals and insects is the notion that ants in general gather food in harvest for a Winter's store. This is quite an error ; in the first place, they do not live on grain, but chiefly on animal food ; and in the next place, they are torpid in the Winter and do not require food. There is in Poonah a grain-feeding species which stores up millet seed, but certainly our ants have no claim to Jane Taylor's stanza :

' Who taught the little ant the way
Its narrow hole to bore,
And labour all the Summer day
To gather Winter store ? ' "

C. C. Bombaugh, A.M., M.D., p. 213, *Facts and Fancies for the Curious* (U.S.A., 1905).

That making a Noise with a Frying-pan, Kettle, or Warming-pan, or a combination of these, will cause a Swarm of Bees to Settle

The Rev. Thiselton Dyer, *English Folk-lore*, p. 124, " Virgil's precept is followed everywhere :—

" 'Tinnitusque cie, et matris quate cymbala circum'; the instruments used for ringing them down being generally the frying-pan and one of the house door-keys."

In *Tusser Redivivus* (1744), p. 62, we read, "The tinkling after them with a warming-pan, frying-pan, kettle, is of good use to let the neighbours know you have a swarm in the air, which you claim wherever it lights; but I believe of very little purpose to the reclaiming of bees, who are thought to delight in no noise but their own."

More convincing are the experiments of Sir John Lubbock, F.R.S., p. 290, *Ants, Bees and Wasps* :—

"The results of my experiments on the hearing of bees has surprised me very much. It is generally considered that to a certain extent the emotions of bees are expressed by the sounds they make, which seems to imply that they possess the power of hearing. I do not by any means intend to deny that this is the case. Nevertheless, I never found them take any notice of any noise which I made even when it was close to them. I tried one of my bees with a violin. I made all the noise I could, but to my surprise she took no notice. I could not even see a twitch of the antennæ. The next day I tried the same with another bee, but could not see the slightest sign that she was conscious of the noise. On Aug. 31, I repeated the same experiment with another bee with the same result. On Sept. 12 and 13, I tried several bees with a dog-whistle and a shrill pipe; but they took no notice whatever, nor did a set of tuning-forks which I tried on a subsequent day have any more effect. These tuning-forks extended over three octaves, beginning with *a* below the ledger line. I also tried with my voice, shouting, etc., close to the head of a bee; but in spite of my utmost efforts, the bees took no notice. I repeated these experiments at night when the bees were quiet; but no noise that I could make seemed to disturb them in the least."

And at p. 222, Sir John says, "I have over and over again tested them with the loudest and shrillest noises I could make, using a penny pipe, a dog-whistle, a violin, as well as the most piercing and startling sounds I could produce with my own voice, but all without effect."

Hence, *if* the key and frying-pan have any effect we are left to assume it must be the *sight* which is the cause. Possibly the bees are interested in the antics of the villagers and come down to see what the latter are going to do next!

". . . the honey bee, a little animal (*sic*) vulgarly credited with all manner of virtues that, in all probability, it does not possess."—*Globe*, June 30, 1911, p. 1.

Vide "W.B.T." in the *Daily Mail*, July 31, 1919; and "C.F.S." in issue of July 20, 1920.

That Smoke Stupefies Bees

"So bees with smoke and doves with noisome stench
Are from their hives and houses driven away."
Henry VI. (I.), I., v., 23.

"When we wish to open the hive and to examine the combs, we must first puff in a little smoke at the door. Ordinary tobacco smoke would do quite well, but we more often use a rolled-up piece of brown paper, or some old rag, which are allowed to smoulder. They are placed inside a tin, which is fixed to a pair of bellows, and by working the bellows with our hand we are able to puff out any quantity of smoke from the nozzle with which the tin is fitted. This is done to frighten the bees, and not to stupefy them, as most people think. As soon as the smoke reaches them they rush to the store-houses in order to take in provisions, for they think some terrible calamity is about to occur. . . . after taking in supplies they wait to see what is going to happen."—Ellison Hawks, p. 53, *Bees shown to the Children*.

"Experience has also shown that, when alarmed, bees instinctively begin to fill their honey-sacs with food from the nearest store-cells as a safeguard against contingencies, and when so provided they are more amenable to interference. The bee-keeper, therefore, by the judicious application of a little smoke from smouldering fuel, blown into the hive by means of an appliance known as a bee-smoker, alarms the bees and is thus able to manipulate the frames of comb with ease and almost no disturbance."—*Ency. Brit.*, 11th ed., III., p. 636.

That "the Devil's Coach-horse" Beetle Stings

Its other names are "Cock-tail" and *Ocypus olens*, derived from its properties (*a*) of cocking up the posterior portion of its anatomy, (*b*) of emitting a fetid smell for defensive purposes.

"I have often heard this beetle called 'a horrid creature'; but in its habit of turning up its abdomen in threatenins fashion it exhibits more bark than bite. The insect hag

found out, no doubt, that this habit is of service to it, and on the least provocation does not omit to show disapproval in the manner indicated. It cannot sting, as is often supposed; but the upturned abdomen and open mandibles make quite an impression upon the onlooker, and doubtless his strong jaws would be able to make still more impression upon one's finger."—W. Percival Westell, F.L.S., p. 104, *The Story of Insect Life.*

That the Glow of the Female Glow-worm is to Direct the Flight of the Male

"And light them at the fiery glow-worm's eyes."
A Midsummer Night's Dream, III., i., 162.

"The use of the bright light of the female glow-worm has been the subject of much discussion. The male is feebly luminous, as are the larvæ and even the eggs. It has been supposed by some authors that the light serves to frighten away enemies, and by others to guide the male to the female. At last, Mr. Belt (*The Naturalist in Nicaragua*, 1874, pp. 316-324), appears to have solved the difficulty: he finds that all the Lampyridæ which he has tried are highly distasteful to insectivorous mammals and birds. Hence it is in accordance with Mr. Bates' view, hereafter to be explained, that many insects mimic the Lampyridæ closely, in order to be mistaken for them, and thus to escape destruction. . . . the female glow-worm . . . closely resembles a larva, and as larvæ are so largely preyed on by many animals, we can understand why she has been rendered so much more luminous and conspicuous than the male; and why the larvæ themselves are likewise luminous."—Chas. Darwin, p. 426, *Descent of Man* (1901).

John Timbs in his *Things Not Generally Known*, 1st Series, 1860, p. 92, gives a quotation from *Westwood's Classification of Insects*, refuting the popular explanation.

"This faculty of emitting light is one of the most puzzling circumstances in their history—nor is it easy to conjecture what end it serves. The suggestion, frequently advanced, that its purpose is to guide the winged male to the apterous female in the darkness of the night, is by no means a satisfactory explanation; for, besides the fact that other nocturnal insects need no such aid, in many species of the genus both sexes are luminous, and both furnished with wings."—T. Rymer Jones, F.R.S., p. 93, *The Animal Creation* (*c.* 1865).

For all this in *Ency. Brit.*, 11th ed., XII., 138A, we read, " The light given out by the wingless female insect is believed to serve as an attraction to the flying male, whose luminous organs remain in a rudimentary condition."

Vide *The Glow-worm and other Beetles*, by J. Henri Fabre (1919), and review of it at p. 463, *Nature*, Dec. 9, 1920.

That a Katy-did is a Bird

It is a variety of locust.

" In North America the Katy-did (*Platyphyllum Concavum*, one of the Locustidæ) is described (Harris, *Insects of New England*, 1842, p. 128), as mounting on the upper branches of a tree, and in the evening beginning ' his noisy babble, while rival notes issue from the neighbouring trees, and the groves resound with the call of *Katy-did-she-did* the live-long night.' "—Chas. Darwin, p. 435, *Descent of Man*, 1874.

It is, as usual, the male that does the " singing," though the female does condescend to chirp a reply if she feels so inclined.

That the Tsetse Fly is about three times the length of a Blue-bottle Fly, with its wings set up at right-angles to the ground and with its abdomen wholly exposed

This fly is a great pest in parts of South Africa. Its bite is fatal to horses, oxen and dogs, but donkeys are immune. Man too, is liable to that terrible and fatal disease, sleeping sickness if bitten by another species(*Glossina palpalis*) of tsetse. An illustration of one will be found in the *Harms. Ency.* from which it will be seen that it is much like a blue-bottle in size and shape. Preserved specimens may also be seen in the Central Hall of the Natural History Museum at South Kensington.

That it is a common occurrence for a Swarm of Bees to be found in the Carcase of a Lion or other large animal

" . . . . *and he (Samson) turned aside to see the carcase of the lion ; and, behold, there was a swarm of bees and honey in the carcase.*"—Judges, XIV., 8

" *And he said unto them, Out of the Eater came forth meat, and out of the strong came forth sweetness.*"—Judges, XIV., 14.

" *'Tis seldom when the bee doth leave her comb in the dead carrion.*"—King Henry IV. (2), IV., iv., 78.

Samson's mistake was made by his arriving at a somewhat natural conclusion without sufficient investigation, but

we must remember that he was deeply in love at the time! Some flies which frequent decomposing meat are not unlike bees at a hasty glance, and when disturbed at their meal they make a considerable buzzing noise. This is probably how the mistake was made.

Sir Richard Gregory refers to this matter in his *Discovery*, p. 118:—"Another curious case of deceptive appearance gave rise to the widespread belief in the production of honey by bees in the carcases of dead animals, and principally from those of oxen, whence the term Bugonia—oxen-born—used in Greece to describe it. Virgil referred to the legend in his Fourth *Georgic*, . . .

"'Thinking is difficult, and acting according to reason is irksome,' said Goethe. For more than two thousand years people overlooked the likeness between the drone-fly and the honey-bee, and believed in a tradition which a single experiment would have shown to be without the slightest foundation."

That when Honey is sometimes Poisonous it is due to poison produced by the Bees

"Honey that Drove Men Mad.

"In the September issue of *Discovery*, Prof. W. R. Halliday, with the help of his colleague, Prof. McLean Thompson, has cleared up a difficulty unsolved by editors of Xenophon's 'Anabasis.' The historian describes how the retreating Greeks, when they arrived near Trebizond, ate some honey, with effects ranging from intoxication to insensibility. Some authorities have denied that poisonous honey was found in Pontus, but the writers now point out that there is no evidence to show that the breed of bees in Pontus, or the general climatic condition, was responsible for this poisonous honey. When honey is produced in excess, and the floral parts fail to develop, there results an accumulation of by-products in which toxins abound. When the competition for nectar pollen is intense many insects develop a biting habit, piercing the tissues of plants in search of short-cuts to food supply, and this habit results in the formation of poisoned honey. The observation of Pliny that honey was poisonous in some seasons and not in others is thus proved to be accurate, and can be explained on scientific grounds."—*Nature*, Sept. 30, 1922, p. 462.

That House-flies hibernate during the Winter

"Entomologists, it appears, have not yet solved the problem of what becomes of the house-fly in winter-time. The popular idea that when the cold season comes the house-flies, or such of them as do not die off, retire to some quiet nook or cranny in the house and, like dormice, sleep undisturbed through the winter is still entertained in some scientific and other respectable quarters, although no trustworthy evidence has been found to support it. There are flies and flies; and, as Dr. L. O. Howard was, we believe, the first to suggest, no evidence relating to the hibernation of the house-fly can be trusted until it has first been submitted to expert examination. Since that suggestion was made, a large amount of evidence has been submitted to experts, and now they are almost unanimously agreed that the hibernating house-fly is a wholly mythical creature. But the house-fly must get through the winter somehow, and if not in its perfect state as a fly, then in some other stage or stages of its life, or else we should not be troubled with the pestilent brood year after year in succession. Before the entomologist can tell us exactly how, it looks as if he will need the help of the sanitary officer, the stable-boy, the farm labourer, or even of the Boy Scout, rather than that of the ordinary householder. The search for larvæ and pupæ of the fly is not an easy one, and often involves a great amount of physical labour. In summer-time the pupæ are frequently to be found living at a depth of 2 ft. under the surface of the soil within half a yard of a manure heap. Dr. Gordon Hewitt has searched for them in such places, and in every other likely place, in winter-time, and has never succeeded in finding any alive. But because he, and possibly a few others, have made it and failed, it can scarcely be said that a search of that kind has been exhausted, and that we must fall back upon the hibernating adult fly as the only alternative. There may be no definite hibernating stage in the life of the fly. The insect may continue to breed in the winter, not exactly as it does in the summer or autumn, but at a greatly retarded rate, each stage being more or less prolonged. This probably does not happen to any extent under natural conditions in this country, but the number of places in which it can happen, and probably does happen, under special conditions may be quite sufficient to account for the perpetuation of the fly."—*Nature*, Oct. 2, 1919, p. 96.

FALLACIES CONNECTED WITH THE ANIMAL KINGDOM.

(d) FISH

Fallacies Connected with the Herring

More nonsense has been uttered about the herring than about all other fish, flesh, and fowl in creation. The exposure of these fallacies has been ably handled in *The Times* :—

" If Sir Thomas Browne were now alive, he might write another volume on ' Vulgar Errors ' all about the herring ; for it illustrates absurdities of almost every kind—scientific, historical, commercial, and political. It is an imposing little animal that has befooled us for a couple of centuries. We have been eating him ever so long ; but all this time we know nothing about the little vagrant, and in books of recognised authority we find statements with regard to its habits that are quite as apocryphal as the old story which Gilbert White contests so vehemently about swallows in the winter migrating to the bottom of rivers, where they spend their time in a torpid slumber. The naturalists declare that the herring goes to the Arctic seas to spawn, and there remains for months afterwards in order to recruit its strength ; we might cite works of high authority in which that tradition is to this very day and in latest editions handed down. It is all nonsense : the herring never leaves our shores. Next to the fictitious gossip regarding the migrations of this little fish are the curious stories of the wealth which it has created, and of its vast importance to human welfare. We hear of Amsterdam being built on herring-bones, and that every fifth inhabitant of Holland was at one time engaged in the herring-fishery. This, too, is a ridiculous hoax. Amsterdam is built on something far more precious than herring-bones ; and it has been calculated that if the tales current with regard to the Dutch trade in herrings be correct, then every able-bodied man in the country must have been engaged in the business.

" Our herring-fisheries are now a valuable property, in which altogether from two to three millions of money are sunk, about half a million being sunk in boats, nets, and lines alone. In many parts of Scotland a hundred herrings can be purchased for sixpence. The Scotch-cured herrings have a large sale on the Continent, and in some places are even superseding the Dutch."

That Flying Fish fly, in the sense that they flap their fins as Birds do their wings

Sir Ray Lankester, F.R.S., writing in the *Daily Telegraph* of Jan. 29, 1912, said, "... the fan-like pectoral or anterior fins—are spread out like a pair of wings when the fish leaps from the surface of the water. They act as do the expanded 'wings' of a monoplane 'flying machine.'

"The fishes in question are the so-called 'flying fishes,' but in reality they do not 'fly' in the restricted sense of the word any more than do our lately-invented monoplanes, for the wing-like structures do not strike the air, but serve merely as parachute-like supports or floats .... The motor-power in the case of the flying fish is in the original stroke of the tail on the water as the fish leaps. This has been disputed, but it is certain that the flying fish have no muscles sufficiently powerful in connection with the expanded fins to enable them to give an effective stroke in the air ..... Their flight is in a straight line, and very rapid, exceeding that of a ship going 10 miles per hour, but the distance made at any one 'flight' does not exceed 500 feet. In calm weather they do not rise and fall and rise again in flight, but keep an even course, gradually dropping to the surface of the water. In windy weather, on the other hand, the currents of air carry them up and down over the crests of the waves, and occasionally they are raised by vertical currents against the side of a ship to the height of 20 feet and fall on deck. But this never happens in calm weather, and never from the lee side."

The Author's father said that after many careful observations he found that flying fish help their flight by a very quick and vigorous action of their tails in the crests of the waves. The waves were large ones, perhaps 100 feet apart, and the fish gave a sort of kick-off from the crests as they passed over them. Prof. C. V. Boys, F.R.S., and Dr. Hankin, confirmed this observation when it was mentioned to them by the writer. It was confirmed by W. N. F. Woodland at p. 455, *Nature*, June 10, 1920; by Prof. Wilson Jones at pp. 233-4; *Nature*, April 21, 1921, and by H. H. Clayton, at p. 714, *Nature*, Aug. 4, 1921.

The motion of the fins may be likened to that of a flag or piece of paper, held by one edge, in a wind.

For some time the principle of the flight of flying-fish was in question, but recent observations and the anatomical

examination of the fish, have made it amply clear that they do not fly in the sense that birds do. Only lack of space prevents many quotations being made from *Nature*, especially the long illustrated article by Prof. F. Wood-Jones, F.R.S., the anatomist and naturalist, at pp. 233-4, *Nature*, April 21, 1921. Other articles in *Nature* are : Dr. J. McNamara, June 3, 1920 ; W. N. F. Woodland, and Sir David Wilson-Barker, both at p. 455, June 10, 1920 ; p. 518, Dec. 16, 1920 ; Julian S. Huxley, p. 267, April 28, 1921 ; and H. H. Clayton, p. 714, Aug. 4, 1921.

That Deep-sea Fish are very strongly built in order to resist the great pressure due to the sea water

The principle here involved is like that in the case of bodies which are popularly supposed to float after sinking to a certain depth (*quod vide*). Deep-sea fish are modified to suit their peculiar environment, but this modification does not consist in greatly strengthening their bodies, because it is not necessary. On the contrary, their osseous and muscular systems are feebly developed, the bones having a fibrous, fissured, and cavernous texture. The pressure is great, but it acts not only inside and outside of the fish, as a whole, but inside and outside of each cell or particle of which the fish is constructed, and, consequently, there is no more tendency to crush the fish than there is for our bodies to be crushed by the atmospheric pressure, which amounts to 15 lb. per square inch. If these fish were suddenly taken down into still greater depth, then they would suffer from the increased pressure, on account of there not being time for the balancing effect to take place. When they are suddenly brought up from their natural depths to less ones, they suffer also, for again there is a want of balance of pressure. In this case the pressure of the air and gases inside them is greater than the reduced pressure outside, and, as a result, some of the tissues are ruptured ; but were they slowly raised, then probably this rupturing would not occur. The action is similar to that experienced by divers, or men who work in compressed air in the construction of tunnels. If they are not careful to come out of the pressure slowly (which they are enabled to do by means of the air-lock) they are liable to suffer from the troublesome complaint known as " compressed-air sickness."

That true Whitebait is a particular species of Fish which never grows large

This was for a long time a knotty point even with naturalists, as will be seen by the following quotation from the *Cent. Dict.* :—

"The identity of whitebait has been much discussed and disputed. They have been supposed to be a distinct species, named *Clupea alba*, and even placed in a genus framed for their reception as *Rogenia alba*. They have been more generally recognised as the fry of certain clupeoids, as the sprat (*Clupea sprattus*), the herring (*C. harengus*), and the shad. But careful examinations of great quantities of whitebait, made in different localities at different times, have shown these opinions to be more or less erroneous. Whitebait consists, in fact, of the fry of several different clupeoid fishes, mainly the sprat and the herring, with occasionally a small percentage of other fishes; and the relative quantity of the different species represented varies, moreover, according to season and locality."

That the Numbers of an Individual Species depend on its Powers of Propagation

The footnote at p. 190 of *A Naturalist's Voyage Round the World*, by Chas. Darwin, F.R.S., is as follows :—

"I was surprised to find on counting the eggs of a large white Doris (this sea-slug was $3\frac{1}{2}$ inches long), how extraordinarily numerous they were. From two to five eggs (each three-thousandths of an inch in diameter) were contained in a spherical little case. These were arranged two deep in transverse rows forming a ribbon. The ribbon adhered by its edge to the rock in an oval spire. One which I found measured nearly twenty inches in length and half in breadth. By counting how many balls were contained in a tenth of an inch in the row, and how many rows in an equal length of the ribbon, on the most moderate computation there were 600,000 eggs. Yet this Doris was certainly not very common; although I was often searching under the stones, I saw only seven individuals. *No fallacy is more common with naturalists, than that the numbers of an individual species depend on its powers of propagation.*"

That Mackerel is Unwholesome in Winter

A variant of this is that mackerel is not in season until the 23 and 24 Chapters of Numbers have been read in Church

as the lesson, *i.e.*, until the Mar. 12. Yet another form is that the fish is in season when Balaam's ass speaks in Church.

The fallacy was given among a number of others under the heading "Somersetshire Folk-lore," by M. A. Balliol in *Notes and Queries*, Vol. IX., p. 536, and the *Daily News* of Aug. 22, 1908, had this paragraph on the subject :—

"THE MALIGNED MACKEREL.

"The St. Ives Fishery has sought the aid of the Board of Agriculture and Fisheries to help to destroy the prejudice which exists against the consumption of mackerel in winter months. Almanacs and cookery books continue to foster the error, so inimical to the fishing industry. The Board of Agriculture and Fisheries have inserted in the current annual report that there is no reason for such prejudice, which probably arises from the fact that it is only within recent years that mackerel have been brought to the market in any considerable quantity during the winter."

Sir Henry Thompson (*Food and Feeding*) does not support the popular prejudice.

That the Fish called the John Dory (Zeus Faber) is the one from whose Mouth Christ told Peter to take the Tribute Money

"The curious fancy among the fishermen, associating the black blotch on each side of this fish with the thumb and finger of St. Peter when taking the tribute money, has been so frequently related as to need no more than passing mention." F. G. Aflalo, p. 138, *British Salt-Water Fishes* (1904).

"The spots on the sides are vulgarly supposed to be the marks made by St. Peter's thumb when he took the tribute penny from its mouth ; and according to Belon it is called *Christopsaron* in modern Greek, and is frequently suspended in the Greek churches by fishermen."—*Museum of Natural History*, Vol. II., p. 137.

"The colour is sometimes olive green, and there are two dark patches on the sides, which are (as in the haddock) fancifully interpreted as the marks of the apostle Peter's fingers. Others have referred the marks to St. Christopher." —*Chamb. Ency.*, Vol. IV., p. 64.

That Sprats are Young Herrings

This is still a common belief, even among fishermen. Mr. A. H. Patterson, *Man and Nature on Tidal Waters*, p. 275,

states that, " There still exists a belief that sprats are the young of the herring."

The sprat (*Clupea sprattus*) can be distinguished from the young herring (*Clupea harengus*) by (1) its serrated belly ; (2) the dorsal fin commencing behind the point opposite the pelvic fin ; (3) its larger scales ; (4) its characteristic flavour ; (5) there being seven rays in its pelvic fin in place of nine ; and (6) the strong sharp spines on the belly compared with the weak ones of the herring.

That a Cuttle-fish is a Fish

A cuttle-fish is an octopus. Mollusks form the third division of invertebrate animals. The seventh class of mollusks are the Cephalopoda (meaning " head-footed ") and the cuttle-fish or octopus belong to this class. The cuttle-fish " shell " or " bone," which is common on the sea-shore, is a curious structure, and during the life of the cephalopod it is enclosed in a cavity of the mantle, wherein it lies quite loose and unattached. It is supposed to act as a float and thus facilitate the movements of the animal.

The lamprey of our rivers and the hag or " devourer " of the North Sea are not fish in the strict sense of the word, as they differ in many important respects from true fishes though agreeing with them in many others. Hence some naturalists have given them a class to themselves—the Cyclostomes, meaning " round mouths."

That the Flat-fishes—Turbots, Plaice, Soles, and Dabs—rest on their Bellies, and that the coloured surface is the back of these Fish

Appearances are proverbially misleading—they certainly are in this case, which is one of the most reasonable of popular fallacies !

The growth of these fish is remarkable. When young they are like any ordinary well shaped fish, but as they grow up they appear to take to a form of tight-lacing (!) which results not in a circular, but in a flat form, owing to their sides being squeezed in. When this form has been attained, they can no longer rest comfortably in a vertical plane, so they fall over to one side—some kinds to one side, some to the other. In this position (in which they also swim) an eye on the underside would be of little use to them,

so the eye that would be on the underside (if it remained there) accommodatingly, and gradually with the growth of the fish, shifts over to the other (upper) side where it is of use! If this change had taken place in a few thousand years it would have been wonderful. For it to take place in the lifetime of each of these fish is marvellous. The underside becomes colourless.

That River Fishes subsist mainly on Worms and Grubs

"The food of river fishes was better known; but what was, until recently, thought to be their principal food now appears to play only a limited part in their maintenance, and the common fisherman's view, that river fishes work hard for their living and subsist mainly on worms and grubs, with a change to may-fly in the season and occasional feasts of ground-bait and paste, is almost as far removed from fact as the showman's description of the elephant's diet as consisting mainly of cakes and hay."—C. J. Cornish, p. 241, *Animals at Work and Play* (1896).

That the Fish, Lemon Sole, has some connection with Lemon the Fruit

French, *limon* = a lime from which English got *lemon*, but modern French has *citron* = lemon, and *cédrat* = citron.

Lemon sole is from French *limande*, a flat-fish, dab, which neither looks, tastes, nor grows like a lemon.

That a Shark will not attack anything which it thinks is Dead

Mr. Frank T. Bullen, maritime traveller and author, wrote as follows to the *Daily Mail* of June 28, 1909:—

"Sponge Divers and the Shark.

"In your précis of Mr. Carew Hunt's report on the sponge fishery in Florida it is stated that 'a shark will not attack anything he takes for dead.'

"A shark will attack anything, alive or dead, that he imagines to be eatable, but if any living thing, such as a man, for instance, can make a hubbub in the water the shark will not attack, being a most timorous creature. But as to not attacking anything dead, the shark is the greatest of all the sea scavengers, and anyone who doubts this should see a hundred or so of them feasting upon a dead whale.

"This, however, is only an instance of the many fabulous

stories current about the shark, which outnumber those about any other animal in their fantastic character. It is, however, so far as I am aware, the most diametrically opposed to the truth of any of them.

" Melbourn, Cambridgeshire. FRANK T. BULLEN."

Two days later the following confirmation appeared :—

" DIVING AMONG SHARKS.

" To the Editor of the *Daily Mail.*

" SIR,—I most cordially endorse the remarks on sharks made by Mr. Frank T. Bullen. No one who has read, *The Cruise of the 'Cachalot'* can doubt his experience of their voracity, etc., with which my own agrees.

" During the Abyssinian expedition in 1868, while lying off Zoulla, in Annesley Bay, well known then as shark infested, hundreds of us were overboard daily for hours bathing, and although we had a few scares I never heard of any man being actually eaten.

" Further, when lying in Aden Harbour and Suez Road, both of which once teemed with sharks, I and many other venturous swimmers have gone overboard at all hours of the day, and some more foolhardy (the writer being one) at dead of night when pitch dark. Needless to say that we kept 'on the move,' made plenty of noise, and were not devoured, although more than one has so lost his life in Aden Harbour to my own knowledge.

" Streatham, S.W. VICTOR M. HOLLINSWORTH."

That all Sharks are Ferocious

Far be it from us to encourage our readers to twist the tail of a shark or to take other liberties with it, but for all this it is as well to know that being in the same water as a shark does not necessarily mean sudden death to the person. Some years ago a kinematograph film was shown in London of a man swimming in water with several sharks one of which he killed with a knife, and none of which appeared to make the least attempt to attack him.

Frank T. Bullen, F.R.G.S., at p. 223 of his *Cruise of the " Cachalot,"* says, " Many of these fish were of a size undreamed of by the ordinary seafarer, some of them full 30 feet in length, more like whales than sharks. Most of them were striped diagonally with bands of yellow [Reminding us of the dazzle painting of 1918 !—ED.] . . . From this

marking is derived their popular name—' tiger sharks,' not, as might be supposed, from their ferocity. That attribute cannot properly be applied to the *squalus* at all, which is one of the most timid fish afloat, and whose ill name, as far as regards blood-thirstiness, is quite undeserved. Rapacious, the shark certainly is ; but what sea-fish is not ? . . . He eats man, as he eats anything else eatable, because in the water man is easily caught, and not from natural depravity or an acquired taste begetting a decided preference for human flesh. All natives of shores infested by sharks despise him and his alleged man-eating propensities, knowing that a very feeble splashing will suffice to frighten him away even if ever so hungry." If any reader, therefore, ever has the misfortune to be eaten by a shark he may be comforted in his last moments by the reflection that the shark bears him no ill-will, and that he will cause him no unnecessary pain during the process. In fact the eating may almost be considered a thoughtless over-sight on the part of the shark !

The *Pelagic* and *Galeocerdo* sharks are large and dangerous to man, but the 11th ed. of *Ency. Brit.* refers to others which are not, and which will go away if not attacked by man.

A white man travelling in America was going to bathe in a river, whereupon his nigger servant stopped him, saying there were alligators in the river there, but that lower down, in the estuary, there would be none. So the white man went to the latter place and went in and finding there were none called out to ask his servant how he knew there were none there ; to which the nigger replied, " Because de sharks scare dem all away " !

That the presence of an irritating intrusive body in a Pearl-Oyster determines the formation of a Pearl

Pearl-oysters are liable to have thousands of grains of sand washed into them by the tides, but only a small percentage of pearl-bearing oysters do in fact yield pearls.

Dr. H. Lyster Jameson had a three page, illustrated article in *Nature*, May 26, 1921, on *The Japanese Artificially Produced Pearl*, pp. 396-8, in which he stated, " Mr. Mikimoto's success is based on the fact, which follows from my work in 1902, and was further demonstrated by Alverdes's remarkable experiments ten years later, that *it is not the presence of an irritating intrusive body that determines the formation of a pearl,*

but the presence in the sub-epidermal tissues of the oyster of a closed sac of the shell-secreting epidemis, . . . no irritating body introduced into the shell or tissues can be expected to become the nucleus of a pearl."

FALLACIES CONNECTED WITH THE ANIMAL KINGDOM.

(e) VARIOUS

That it can Rain Frogs

" Let the sky rain potatoes ; let it thunder to the tune of ' Green Sleeves,' hail kissing-comfits, and snow eringoes."—The Merry Wives of Windsor, V., v., 18.

It is necessary for a frog, not to " keep his powder dry," but to keep his skin moist, in order that it may function. Hence frogs are only found in moist places, and where water is close at hand. Sometimes they hide from the sun under stones and bits of turf, and occasionally come out in great numbers after a shower of rain, and this has given rise to the tales about it " raining frogs."

" Showers of Frogs.

" Sea-serpents have been scarce in recent years, and the giant gooseberry is a tradition merely ; but the shower of frogs is a hardy annual which may be looked for with confidence in July whenever the season is favourable. A period of heat and drought is usually followed by a sharp downpour of rain ; and, lo, what was sunbaked soil on Monday becomes on Tuesday a moist, soft surface on which myriads of tiny frogs or toads are leaping or scrambling about. The average observer is as much puzzled to account for their presence as the king who harassed his royal brain to discover how the apple got inside the dumpling. If he is of a severely scientific turn of mind he will argue that sudden showers in July argue atmospheric disturbances ; that atmospheric disturbances generate waterspouts ; and that waterspouts carry small bodies into the air : therefore, the frogs on the croquet lawn must have been carelessly spilt there by a waterspout.

" This sapient conclusion affords material for a letter to the local newspaper, whence the ' facts ' are reproduced in the form of paragraphs which go round the Press of

the world. In reality the little creatures have doffed their tadpole tails and have wandered in their thousands far afield. During the day a crack in the gound, a dead leaf, or an empty snail shell affords them shelter, and during the night they travel in pursuit of small insects. Then comes the shower of rain. It fills the cracks in the ground, washes away the dead leaves, and chokes up the snail shell with mud-splashes. But what matter? The little frogs are all over the place, revelling in the longed-for moisture; and the observer is taking notes of the 'phenomenon.' Hence our annual showers of frogs, carelessly dropped by water-spouts."—*Globe*, July 20, 1898.

"What has really happened is merely a simple occurrence of the season which may be witnessed every year in greater or less degree when July storms follow days of drought. For the little frogs which left the water by thousands, when they lost their swimming tails and gills for breathing under water, have been hiding during the drought in cracks and crannies, under tufts of grass, or whatever shelter retains some of the damp coolness of night through the dry heat of the day; and to them the downpour of the thunderstorm comes as sudden relief from prolonged distress. In a minute or two the wet surface of the field is alive with them, soaking in the welcome moisture. As you walk along the sodden field path later, they leap aside in all directions before your steps. This is all the miracle. E. Kay Robinson."
T.P.'s Weekly, July 17, 1908.

"If it were not that a newspaper lives for to-day, and neither for yesterday nor to-morrow, a common occurrence like a fall of black snow would hardly have been worth recording. They have had one in the Lower Emmen Valley, above the Lake of Brienz, where the snow is said to have been as black as if it had lain in a city for a week. We can match the portent ourselves. Some years ago there was a fall of 'blood-rain' in Camden Square, due to the presence of swarms of a minute moving water-plant, known as *Sphœnella pluvialis*. An organism closely allied to it gives the colour to red snow, which has been known to fall at Carmola in Germany, in Italy, in the Tyrol, and within the Arctic Circle. Sand also causes red snow; at least Prof. Salcher was of opinion that the phenomenon in the South of Europe was due to the sand of the Sahara carried across the Mediterranean by the sirocco."—*Observer*, Jan., 1911.

"A Shower of Sand-eels.

"About 3 o'clock on the afternoon of Saturday, Aug. 24 last, the allotment-holders of a small area in Hendon, a southern suburb of Sunderland, were sheltering in their sheds during a heavy thunder-shower, when they observed that small fish were being rained to the ground. The fish were precipitated on three adjoining roads and on the allotment gardens enclosed by the roads; the rain swept them from the roads into the gutters and from the roofs of the sheds into the spouts.

"The phenomenon was recorded in the local newspapers, the fish being described as 'sile.' I was away at the time, but, seeing the account, I wrote to Dr. Harrison, and thanks to him, and especially to Mr. H. S. Wallace, I obtained a sample of the fish, and I was able yesterday (Sept. 5) to visit the place in the company of the latter gentleman.

"From those who saw the occurrence we derived full information, which left no doubt as to the genuineness of what had been stated, and this we were able to put to the test, for a further sample was obtained from a rain-barrel which could have got its supply only from the spout of the shed to which it was connected. The precipitation of the fish, we were told, lasted about ten minutes, and the area involved Commercial Road, Canon Cocker Street, the portion of Ashley Street lying between these streets, and the adjoining gardens. The area measured approximately 60 yards by 30 yards, and was thus about one-third of an acre. It is not easy to say how many fish fell, but from the accounts it may be gathered they were numerous; there ware apparently several hundreds.

"There can be no question, therefore, that at the time stated a large number of small fish were showered over about one-third of an acre during a heavy rain accompanied by thunder; we were informed that no lighting was observed, and that the wind was variable.

"All the examples which came into my hands from different parts of the ground and from the rain-barrel prove to be the lesser sand-ell (*Ammodytes tobianus*). They all, moreover, are about 3 in. in length, or 7·5 cm. to 7·9 cm. They are not 'sile,' a name usually given to the very small young of the herring. But the sand-eels are sea-fish, and it is evident that the sand-eels showered to the ground at Hendon were derived from the sea.

" On sandy beaches around our coasts the lesser sand-eel is very common. As its name implies, it burrows into the sand, but in the bays it may often be seen not far from the surface swimming about in immense shoals—shoals which are characterised by the members being all about the same size.

" The place where the sand-eels in question were deposited lies about one-quarter of a mile from the seashore, but it is probable that the minimum distance of transport was at least half a mile.

" The only explanation which appears to satisfy the conditions, therefore, is that a shoal of sand-eels was drawn up by a waterspout which formed in the bay to the south-east of Sunderland, and was carried by an easterly breeze to Hendon, where the fish were released and deposited. It is significant that the area of deposition was so restricted, and that no other area was affected. The origin and the deposition were therefore local.

" We were informed that the fish were all dead, and, indeed, stiff and hard, when picked up immediately after the occurrence. This serves to detract from the possibilities of distribution being influenced by such an occurrence, but it is possible that other species would be able to withstand such an aerial method of dispersion. It is more than probable that the vortical movement of a waterspout would transport plankton. This was naturally not observed in this case, and the small creatures, including eggs and young stages, would likely be carried over a wider area. A. MEEK."

" Dove Marine Laboratory, Cullercoats. Sept. 4."

Nature, Sept. 19, 1918, p. 46.

These being the facts regarding salt water fish, it seems possible that frogs might be lifted by a whirl-wind from a fresh water lake or pond and transported some distance.

" Rains of Fishes.—For just on four hundred years circumstantial stories of fish falling with rain have appeared in various parts of the world. Naturally, such strange occurrences have given rise to much speculation and many even stranger theories by way of explanation. The whole subject is admirably reviewed by Dr. E. W. Gudger in the November—December issue of *Natural History*—the Official Organ of the American Museum of Natural History, which has just reached us. Dr. Gudger accepts such occurrences,

and rightly, as well authenticated; he accounts for them as due to the agency of high winds, whirlwinds, and water-spouts, which could easily draw up either from the sea or rivers, shoals of small fishes swimming at the surface in the track of these uplifting agencies. As their force is spent they distribute their victims along their path."—*Nature*, April 1, 1922, p. 423.

Hence possibly there is no fallacy in the statement at the head of this article, but the author is leaving the matter in, as the event is so frequently said to happen, and consequently it may be searched for herein.

That a Scorpion, surrounded by Fire, will commit Suicide by Stinging itself to Death

" Though this well-known tale has been perpetually repeated, and has even been related to the present writer with some very minute and extraordinary details, it must be held to be merely a 'traveller's story.' Probably in some instances the poor scorpion has been burnt to death, and the well-known habit of these creatures, to raise the tail over the back and re-curve it so that the extremity touches the forepart of the cephalo-thorax, has led to the idea that it was stinging itself. Perhaps, under pain of scorching, there may have been convulsive efforts and movements of the highly nervous and sensitive tail in this position, and the point of the sting may even have been inserted between the articulation of the cephalo-thorax and abdomen, and what more would be wanting to make a wonder-loving traveller believe that it had really committed suicide? "—The Rev. O. Pickard Cambridge, M.A., *Ency. Brit.*

Mr. C. E. Clark says that experiments have shown that a scorpion's poison has no effect upon itself, and that when one is placed in a test-tube, so that the sting cannot be used, and subjected to a moderate temperature (50° C.) it quickly dies. When the sun's rays are concentrated on a scorpion by means of a lens, it raises its tail and appears to try to remove the cause of irritation therewith, and then may die, in which case it is alleged to have committed suicide, but in reality it has been killed by the heat to which it was exposed.

The *Century Dict.* says :—" Some popular beliefs respecting scorpions have no foundation in fact, as when the creature

is surrounded by fire, it stings itself to death rather than be burned, or that some fluid extracted from a scorpion will cure its sting."

" 'Tis true a scorpion's oil is said
To cure the wounds the vermin made."
—S. Butler's *Hudibras*, III., ii., 1029.

That there is an Animal called a Salamander which lives in Fires

Cockeram in his dictionary published in 1623 defines a Salamander as :—" A small venomous beast, with foure feet and a short taile, it lives in the fire, and at length, by his extreme cold puts out the fire."

" The Salamander (*Salamandra*) belongs to the Urodela division of Amphibia.

" In the Middle Ages, in particular, it was believed that the creature had the shape of a man and lived in fire, the derivation (Greek) of the word meaning a man that lives in a chimney or fire.

" It is also believed that it is a sort of lizard which seeks the hottest fire to breed in, but quenches it with the extreme frigidity of its body. Pliny tells us he tried the experiment once, but the creature was soon burnt to a powder."—*Nat. Hist.*, x., 67 ; xxix., 4.

Prof. T. Rymer Jones, F.R.S., thus describes the animal : —" It is a harmless little reptile from six to eight inches long, thicker and fuller than a lizard, having a pale white belly, and one part of the skin exceedingly black, the other yellow, both of them very splendent and glistening, with a black line going down the back, having upon it many little spots like eggs. This ' daughter of fire, with a body of ice,' was formerly, and is still in some parts, believed to be able to brave the violence of fire, to pass through it unhurt and even to extinguish it in its course, with how much truth we leave our readers to judge. The young of the salamander are produced alive and fully formed ; they often differ from the mother by the possession of gills. The salamander inhabits Central Europe, and occurs in many parts of France."

" Though Salamanders are quite harmless, they have long had, and still retain, a popular reputation of extreme venomousness, and are therefore much dreaded. Strange fables have been current concerning them from remote ages, particularly concerning the icy cold (a reference perhaps to the

moist secretion) which envelops their body, and enables them not only to endure fire without burning, but to extinguish fire. . . . so recently as 1716 the *Philosophical Transactions* recorded how a Salamander, being cast ' into the fire, thereupon swelled presently, and then vomited a store of thick slimy matter, which did put out the neighbouring coals.' "—*Chamb. Ency.*

The Tigrine Salamander (*Amblystoma Tigrina*) of the United States and Mexico lives in water. It is white, about 7 inches long, has four legs and a tadpole-like tail.

Benvenuto Cellini, the Italian sculptor, says that he, as a child, saw a salamander, and his father gave him a good drubbing in order that his (*i.e.*, Benny's) memory might be adequately impressed !—Cellini's *Life*, p. 7.

That a Snake "Stings" with its Bifid Tongue

Snakes do not " sting," they bite. Bees, wasps, hornets, etc., sting.

Venomous snakes, or vipers (a contraction of vivipares), have one long curved fang on each side of the upper jaw, somewhat in the same position as the canine teeth of a cat. This long tooth forms a very small tube which is in communication with the poison gland, and the tooth may be fixed, or hinged ; in the latter case it can be folded back when not wanted for immediate use.

The Bible frequently refers to the *bite* of a serpent, but for all this Shakespeare repeatedly speaks of it as stinging :—

" *What, wouldst thou have a serpent sting thee twice ?* "
Merchant of Venice, IV., i., 68.

" *Snakes in my heart-blood warm'd, that sting my heart !* "
King Richard II., III., ii., 131.

" *An adder did it ; for with doubler tongue*
Than thine, thou serpent, never adder stung."
A Midsummer Night's Dream, III., ii., 72.

" *Guard it, I pray thee, with a lurking adder ;*
Whose double tongue may with a mortal touch
Throw death upon thy sovereign's enemies."
King Richard II., III., ii., 20.

Other Shakespearian references are :—
Henry VI. (2), III., i., 228, 343 ; III., ii., 36, 258, 324.
Henry VI. (3), I., iv., 112.
Hamlet III., iv., 201.
Macbeth III , iv., 31.
Antony and Cleopatra V., ii., 245, 302

"SNAKE-VENOM ANTIDOTES.

"India, with its 20,000 or more deaths from snake-bites annually, is the field for developing antidote serum, and the Parel Laboratory at Bombay is adding other kinds of serum to its supply from cobras. Venom is taken from the cobras every ten days. It is dried, mixed with salt solution, and injected into a horse in doses increasing in two years to 200 times the original. The blood serum from this horse injected promptly, is an effective antidote for the bite of the cobra—but of no other snake."—*Royal Gazette*, Newfoundland, April 18, 1916.

That a Crocodile moves its Upper, instead of its Lower, Jaw, and that it has no Tongue

J. Gibson, in *Ency. Brit.*, says :—"The tongue is attached all round to the bottom of the mouth, and for this reason the crocodile was formerly supposed to be destitute of that organ.

"As in snakes, the lower jaw is attached to a process connected with, and extending backwards from, the skull, which greatly adds to the animal's gape, while giving it the appearance, in opening its mouth, of moving both jaws."

Prof. Rymer Jones, F.R.S., says :—"The lower jaw is prolonged behind the base of the skull, and this structure causes the upper jaw to seem movable. The tongue is flat and free only at the very edge, so that these unwieldy animals have often been described as destitute of a tongue."

In the case of man we believe that many people think that they move both upper and lower jaws when eating, whereas, in reality, it is only the lower jaw which moves.

That Live Toads are found in solid Rocks and Coal

The 13th verse of *Chigwell Re-visited* by James Smith (one of the authors of "The Rejected Addresses") is :—

"So let it be : Time take thy Course ;
Let dotards with tenacious force
Cling to this waning planet—
I'd rather soar to death's abode
On eagle's wings, than 'live a toad'
Pent in a block of granite."

"M. Hérissant in 1777, Dr. Edwards in 1817, and Dr. Buckland in 1825-6, have proved by a series of experiments, that when deprived of air these animals speedily perish ;

but that they will survive for many months without food. Dr. Buckland's conclusions are that toads cannot live a year excluded totally from atmospheric air, and from experiments made by enclosing these animals in cells cut in Oolite that they cannot in all probability survive two years entirely excluded from food."—*Zool. Journal*, vol. v.

Unfortunately, none of the cases in which toads have been said to have been found in solid rock has ever been witnessed by an eminent naturalist; and those who have seen such apparent occurrences have been too interested in the toad itself, and so ready to believe the popular statement, that they have not examined the toad's environment sufficiently carefully. The explanation of these cases is that there was some small passage communicating with a somewhat larger cavity in the stone. That the toad when small got into the cavity and could not get out again, but was able to live there because it was not cut off from the atmosphere, and probably obtained a small amount of nourishment in the form of insects which were able to enter by the narrow passage. Some even think that this passage could become nearly silted up with dirt, which would, of course, add to the delusion. When so confined, their respiration, according to Prof. T. Rymer Jones, F.R.S., becomes extremely limited, and the contact of a small quantity of air with the skin is sufficient to maintain their existence. Being shut up prevents, to a great extent, the loss of moisture from their bodies by evaporation.

Dr. Andrew Wilson, F.R.S.E., dealt fully with this fallacy in his lecture on *Facts and Fictions in Zoology*, delivered before the Sunday Lecture Society in Newcastle-upon-Tyne. The lecture has been published (Walter Scott) and the exposure of the frog fable starts at p. 7.

A distinguished geologist once said, the blow of the hammer that disclosed a live frog inside a block of stone without an opening would at the same time destroy not only geology but the whole fabric of natural science.

Ugliness of Animals.

Sir Thomas Browne observes:—"I cannot tell by what logic we call a toad, a bear, and an elephant, ugly, they being created in those outward shapes and figures which best express the actions of their inward forms, and having passed that general visitation of God, who saw that all

that He had made was good, that is, conformable to His will, which abhors deformity, and is the rule of order and beauty."

" One great cause of cruelty is teaching children to look upon the lower animals, unless they are ' very pretty,' with general dread and dislike. I can well remember how (says Mr. Rowell, in his ' Essay on the Beneficent Distribution of the Sense of Pain '), when a boy I have often picked up a caterpillar, and while admiring its beauty or form, been told to throw it down, and kill it ; that it was a devil's ring, and if it got round my finger, I should never get it off again. Toads and other creatures are cruelly used by boys from an habitual dread and disgust of them ; and it is often thought quite right to torture carnivorous animals, such as the polecat, weasel, etc., as a punishment for their cruel propensities. Children are sometimes taught to look upon such creatures as ' wicked things ' : they are told of the crafty spider that catches the poor flies, or of the cruel hawk which kills the pretty birds : such teaching is not only ridiculous, but in some degree impious, as arraigning the laws of Nature."—John Timbs, F.S.A., p. 92, *Popular Errors*.

That a Crab (or Lobster) is a Red Fish which Walks Backwards

Hamlet to Polonius, *" If, like a crab, you could go backwards."*—Hamlet, Act II., Sc. 2, l. 205.

The error with regard to the colour in this case has no doubt arisen from the fact that we usually see these crustaceans after they have been boiled, and then they are red ; but in their natural state the common colour of a lobster might be described as a dark, dirty blue, while the colour of the common crab is brown. The edible crab of the United States is blue.

With regard to their forms of motion when on land or the sea-bottom, the crab, though capable of moving in any direction, usually moves sideways, but the lobster forwards. When swimming, the lobster darts backwards with a series of jerks, each of which may carry it as far as twenty-five feet.

An amusing anecdote is told of the great French naturalist, Cuvier, in connection with this fallacy. The committee of the French Academy were at work on the Academy dictionary, and had just described a crab as " a small red fish which walks backwards," when Cuvier happened to

go into the room. They read the definition to him, and he exclaimed :—" Perfect, gentlemen, but if you will give me leave, I will make one small observation in natural history. The crab is not a fish, it is not red, and it does not walk backwards. With these exceptions your definition is excellent."

It was indeed a surprise to find a fallacy connected with natural history or zoology in the writings of such a King among observers as J. H. Fabre, who is often called the ' Insect Homer,' but in writing of the ant-lion, he states, " . . . moreover there is another reason that makes it quite impossible for him to run after anything : like the crab, he can only really walk backwards, which is not exactly the way to overtake your quarry when it is in front of you."

In concluding this note, may we plead with those who cook this form of food, that they should reduce the pain to a minimum by plunging the creatures into *boiling* water, instead of putting them into cold water and gradually heating it, as this is a particularly brutal procedure.

That a Snake, cut or hack it as you please, will never die till sunset

This was a popular idea in South Africa nearly forty years ago. On the authority of *Notes and Queries*, it is a common belief, too, in Northamptonshire, Cornwall, Devon and Somerset.

The discussion of this question depends on the definition of death. A dictionary definition is " a total and permanent cessation of all the vital functions." The " tripod of life " is the collective name given to the brain, heart, and lungs of an animal, and we believe that medical men consider a person to be dead when any one of these is destroyed. In spite of all three being destroyed, the muscular system does not at once lose its power of reacting to a stimulus. This is called a reflex action. That this is so is proved by Galvani's well known experiment (said to have been performed previously by Swammerdam) of causing the hind legs (removed from the body, and therefore from the tripod of life) of a frog to move vigorously by stimulating them with a small current of electricity. It is probably an action similar to this which may occur sometimes in the case of a dead snake that causes the belief. Another reason is, that the external appearance and attitude of a dead snake are much more like those of a live one than is the case with most other animals, say,

a rabbit. The snake has no limbs to go limp, and its position when dead may be quite a normal one in life. Hence, it is more difficult to decide whether it is dead or not. The author has shot and otherwise killed snakes in South Africa and the United States, and in the cases of those which he watched carefully with the above statement in mind, he is confident the snakes were dead long before sundown.

" Discussing the action of the Ilfracombe magistrates who fined a fishmonger for cruelty to an eel in cutting it up while alive, a manager in the employment of John Gow, Limited, said yesterday that it was the custom of the trade in dressing an eel to kill it instantly by cutting it through the spine just at the back of the head. It was thus rendered absolutely insusceptible of pain, although in consequence of the reflex action it was a popular superstition that eels remained alive after they had been so treated.

" ' There is no virtue,' he added, ' in having " live " eels. It is a fad on the part of the public. Eels could be allowed to die just as other fish do, and would be none the worse.'

" Dr. Chalmers Mitchell, secretary of the Zoological Society and an eminent authority on pisciculture, said that it was true that the reflex action in the body of an eel gave the impression that it was still able to appreciate the sense of feeling, but life was extinct when the spine had been severed, and after that all sense of feeling would be gone."—*Daily Mail*, Mar. 18, 1908.

That Palms, and other Tropical Plants, then Birds, and, lastly, Man, take possession of Coral Islets as soon as formed in the Pacific

Darwin refutes this fallacy in his *Voyage of a Naturalist* by saying :—" The often repeated description of the stately palm and other noble tropical plants, then birds, and lastly, man, taking possession of the coral islets as soon as formed in the Pacific, is probably not correct. I fear it destroys the poetry of this story, that feather and dirt-feeding and parasitic insects and spiders should be the first inhabitants of newly formed oceanic land."

That the bright red Discoloration of the Sea, at times, near Tierra del Fuego is due to Spawn

This is a popular notion with sailors, and Darwin (*Voyage of a Naturalist*) mentions that he *once* found it to be a fact,

but that the general cause is the number of crustacea (somewhat like prawns as regards form) present in the water at those times.

That an Insect or Animal will not Eat one of its own kind

The phrase "dog cannot eat dog" is fairly common and may be true, but in the case of wolves it is pretty certain that they do eat their freshly killed fellows. An amusing tale of one creature eating another of its own kind is related by Prof. James Sully (*Studies of Childhood*, p. 124), of a little boy in his fifth year playing with a tadpole till it died, whereupon the other tadpoles immediately ate it, and the child cried. His elder sister tried to comfort him by saying:—"Don't cry, William; he's gone to a better place"; which provoked the sceptical question, "Are his brothers, and sisters' stomachs a better place?" Darwin relates that he found one scorpion eating another, and we have read elsewhere of young scorpions eating their mother! Sir J. Dalyell records having seen a horse-leech eat a medicinal leech—the process lasted three hours because the latter leech objected vigorously to the process.

It is also known that rats will eat their own kind, and rabbits sometimes eat their young.

Donald Gunn wrote:—

"Physiologists say, as the result of laboratory experiments, that dogs will feed on flesh of their own kind only with reluctance. But I suspect that, from cannibal man downwards, all flesh-eating animals will devour their own kind, and possibly the more readily when they have been victors in a fight. Fishes and insects live largely on the young of their relatives (or themselves) when available.

"I have seen owls, sparrow-hawks, and dogs eaten by their fellows—the last in Egypt, a very unpleasant sight. The boa-constrictor at the Zoo who swallowed his stable-companion achieved a journalistic success, as you may remember."

That Sponges are Plants, and hence belong to the Vegetable Kingdom

"Many true animals, sea-anemones, sponges, and the like are stationary."—W. E. Carnegie Dickson, M.D., B.Sc., at p. 14, *Bacteriology*.

They have a plant-like appearance, and, consequently, were considered such, even by naturalists, up to the beginning of the nineteenth century. They have since then been recognised as one of the lowest forms of animal life. The sponge as we know it in ordinary daily use is the framework by which the living organism used to be supported, the organism being merely a soft slime enveloping each fibre of the frame. The slime is closely allied to Amœba, another very low form of animal life.

There are two interesting facts connected with living sponges. The first is that though the adult sponge never moves from the place where it once becomes a fixture, the baby sponges are able to swim. And the second is, that all flints were at one time sponges! It is *hard* to believe, no doubt, but truth, remember, is stranger than fiction.

That Coral is formed by Insects—Coral Insects—and that it is comparatively Valueless

An insect invariably has six legs, and three distinct parts, viz., the head, the thorax (to which the legs are attached), and the abdomen. Coral is formed by polyps which are animals, but not nearly so highly differentiated as insects, having in fact soft gelatinous bodies. As to their shape, we may imagine a number of sea anemones joined together, and then greatly reduced in size.

For a full account of the work of these coral animals in forming lagoon-islands, atolls or barrier-reefs, see Darwin's *Voyage of a Naturalist.*

The value of coral, by the economic law of supply and demand, has decreased somewhat in recent years, because it is no longer a fashionable ornament, but formerly some varieties (such as that having a delicate pink or flesh colour) sold for five times their weight in gold; and even to-day, in one list we have consulted, we find the price of a coral necklace (the weight of which must be very small) is £3.

Sir Thomas Browne, M.D. (*Vulgar Errors*, Book II., chap. 5), in dealing with the fallacy "that coral is soft under water, but waxeth hard in air," fell into the graver error, prevalent in his time, and possibly still not extinct of thinking that coral belongs to the mineral or vegetable, instead of the animal kingdom.

That Oysters deposit their Eggs on one another's Shells

In this belief, oysters have been taken from one place to another on the supposition that the white matter sometimes found on their shells is their spawn.

Instead of being so deposited, the eggs are retained within the shell until they are hatched, and then instead of being the little inert creatures which we might naturally suppose, they flit about the sea-water much as a butterfly does in air ; and, having sown their wild oats (if they have escaped their enemies the while) they at length settle down to become steady, solid, domestic oysters ready for the enemies of their old age to swallow with vinegar and pepper. Vide *Shellfish, their Ways and Work*, by Prof. E. Forbes.

That a Horse-leech can Penetrate the Human Skin

Leeches are far less frequently used in medical practice than they used to be in the days when blood-letting was so common ; but the fallacy arose then and continues, the idea being that if a horse-leech be used instead of the medical one (*Hirudo medicinalis*) all sorts of terrible things will happen to the patient by the leech burrowing under his skin. Dr. E. Lankester, F.R.S., was probably one of the first to point out this fallacy, and it is curious to note, what we do not think is commonly known, that one meaning of " leech " is " a physician, a medical practitioner, a professor of the art of healing." Shakespeare, in *Timon of Athens*, the second and third lines from the end, says :—

> *" Make war breed peace, make peace stint war, make each*
> *Prescribe to other as each other's leach."*

Dr. Jind Maly, writing from Prague on July 22, 1908, said :—" This word leech is also to be found in our Bohemian language, lék (pronounced lake) means medicine ; lékar—a physician ; léciti (la-tshi-ti), to heal, to cure, and so it coincides with the original meaning of your word leech."

That the Crabs' Eyes mentioned in ancient Materia Medica meant the visual organs of Crabs

Dr. E. Lankester, F.R.S., states that the crabs' eyes of Materia Medica referred to little pellets found in the stomachs of crabs, and consisting chiefly of carbonate of lime with some phosphate of lime. He thinks they may have had some medicinal value on account of the latter

ingredient. The name crabs' eyes is also applied to the seeds of *Abrus precatorius*, or Indian liquorice, and these also are used medicinally, namely, as a remedy in diseases of the conjunctiva. A more familiar use of these seeds is for rosaries and necklaces.

That the Common Land Tortoise eats Slugs, Blackbeetles and Insects

Because of the popular belief they are called "good gardeners," and are sometimes sold for the purpose of eating slugs, etc., but Prof. T. Rymer Jones, F.R.S., has stated that they feed "exclusively on vegetables." It is possible that blackbeetles do not like sharing their quarters with a tortoise, and that, consequently, they leave. If this should be so, then the end obtained is very like that sought.

"Do you think that Rosetti gave up live-stock after this? Not a bit of it. He tried armadillos and tortoises.

"'How are the tortoises?' he asked his man one day, after a long spell of forgetfulness that he had any.

"'Pretty well, Sir, thank you . . . That's to say, Sir, there ain't no tortoises!'

"The tortoises, brought to eat the beetles, had been eaten themselves. At least, the shells were found full of beetles."—Ellen Terry, *Story of My Life* (1908), p. 64.

According to W. P. Westell, *Story of Insect Life*, pp. 134-5, hedgehogs are fond of eating cockroaches.

That a Nautilus Sails

"Learn of the little Nautilus to sail." Pope.

The tale is that the nautilus (*Argonauta argo*) floats in its shell, holds up some of its arms as sails, and uses one or more for steering purposes. Referring to this myth (which was started by Aristotle) Prof. T. Rymer Jones, F.R.S., says:—"It is almost a thankless office to dispel so pretty a fiction; modern researches, however, serve to show that its sailing capabilities have been greatly exaggerated." As a matter of fact, the nautilus has a greater knowledge of hydraulics than pneumatics or seamanship. Anyway, it swims by means of what an engineer calls jet propulsion, *i.e.*, it takes sea-water into its body and then ejects it forcibly. The arms are trailed behind and used for steering. Its more usual mode of progression is to crawl

along the sea-bottom with its shell the other way up, namely, the same way as a snail carries its shell.

Dr. Andrew Wilson, F.R.S.E., lecturing before the Sunday Lecture Society, Newcastle-upon-Tyne, on *Facts and Fictions in Zoology*, said, "It has been supposed that this is the animal that first gave man the idea of venturing upon the sea in ships. Pope's well-known lines seem to enhance that idea :—

'Learn of the little Nautilus to sail,
Spread the thin oar, and catch the driving gale.'

'Spread the thin oar' refers to the supposed habit of the argonaut of spreading out the arms as oars, and of using the two (which are always coiled round the shell for the purpose of keeping it attached to the animal) as sails. But this is a fiction in zoology, because the argonaut does not spread out the 'thin oar,' or set its sail, at all. . . . . The argonaut, I say, does not sail over the surface of the water in the manner suggested at all. These two arms are never raised off the shell in that position. The shell is not attached to the body at all save by these two arms. If the animal ever lifted up those two arms, the shell would simply leave the animal and sink to the bottom of the sea. . . . But as for sailing on the surface of the sea, and presenting the ship-like appearance the poet describes, I am sorry, for the consistency of poetry, to assert that Pope's lines represent simply a zoological fiction."

"Many people are quite incredulous when they are told that there is just as much likelihood of seeing a mermaid curl her hair as of witnessing a nautilus sail."—The Rev. J. G. Wood, M.A., F.L.S., p. 2, *Nature's Teachings*.

Another marine creature, the Velella, does sail and does not appear to be able to do anything else in the matter of locomotion.

That Snakes Fascinate their Prey before Killing it

"*'Twere best at once to sink to peace,*
Like birds the charming serpent draws,
To drop head-foremost in the jaws
Of vacant darkness and to cease."
Tennyson. In Memoriam, Canto XXXIV., v. 4.

"*And like the bird whose pinions quake,*
But cannot fly the gazing snake,
Will others quail beneath his look,
Nor 'scape the glance they scarce can brook."
Byron. "The Giaour."

"Superstitions about Snakes.

"As snakes fill most men with fear, which is the prolific mother of fiction, hundreds of strange superstitions surround these animals. Born from the soil, they lick the dust for their food; powerful indeed, they are killed by spiders, and cannot stand before crabs; venomous many of them, they are poisoned by human saliva, and flee from the odour of rosemary. . . .

"As a supersition we must also regard the widespread belief that snakes 'fascinate' their prey. Although many observers are convinced of this, the use of the word 'fascinate' has not been justified. No doubt snakes, having no movable eyelids, have an unusual power of steady staring; no doubt birds whose nestlings are threatened will flit anxiously about regardless of danger. . . . It is certain that both men and animals when brought suddenly face to face with something terrible are often panic-stricken and incapable of motion; but there is no evidence that snakes have a power of fascination.

"Scarcely a superstition, but rather an insufficiently confirmed opinion, is expressed in the common belief that snakes swallow their young ones when danger threatens. Were not errors of observation exceedingly common, we should be inclined to accept this strange fact, for the shelter of the mouth is a convenient if somewhat hazardous one, and the young snakes might live there for some time. . . . Some snakes eat other snakes and their bodies have often been found in the food-canals of their larger neighbours. Moreover some snakes are viviparous, and unpractised observers might mistake the oviduct for the alimentary canal."—*Chamb. Ency.*

In a lecture written by the late Mr. Arthur Nicols, F.G.S., F.R.G.S., F.Z.S., entitled, *Snakes and Snake Charming*, that observant naturalist states emphatically that there is no such thing as snake-fascination. He quotes instances of his own observation during a residence of four years in Australia, and gives lantern-slides, from his own drawings, of birds feeding peacefully while snakes are on the point of seizing them. He also gives numerous cases of rabbits and birds and other living creatures playing about upon the bodies of snakes in the cages of the Zoo, where they had been put to provide the snakes with food.

The fallacy is also refuted by Sir Norman Lockyer, F.R.S.,

and Winifred Lockyer in their *Tennyson as a Student and Poet of Nature* (1910), p. 144 ; and in the *Proc. Zoolog. Soc.* of London, 1907, p. 785.

In dealing with this error, Mr. Frank Gibson writes :— " We may at once dismiss the statement that birds or squirrels tumble headlong into serpents' yawning mouths, unable to resist their seductive eyes. The idea is altogether too grotesque, but it is possible that, like many other flagrant errors, it had its origin in a matter of fact. Probably the inventive person who set this fable going saw ' a bird or squirrel ' struggling on the earth a few feet distant from a snake as if the poor creature were held spellbound, and then saw the snake seize it and swallow it. In this case the animal had already been bitten by the reptile, which merely was waiting for death to ensue, well knowing that its prey had no chance of escape.

" Another theory of fascination, and one which seems to be most reasonable, is that the reptiles' prey are stricken with abject, numbing terror."

The following letter of Sir Herbert Maxwell, F.R.S., appeared at p. 4 of *Nature*, Mar. 6, 1919 :—

" The Supposed ' Fascination ' of Birds.

" It is well known that the stoat (*Putorius ermineus*) sometimes performs extravagant antics by way of ruse in approaching rabbits or small birds, which, in the opinion of some persons, are ' fascinated ' or hypnotised by the display. I incline to believe that the subject of these manœuvres becomes so deeply interested, amused, or puzzled by the movements of the acrobat that it defers flight until too late. This view has been strengthened by what I witnessed from my library window in the spring of 1917. A male blackbird was sitting on the open lawn ; a stoat was racing round the bird at high speed, now rolling itself into a ball, racing again, then leaping fully 2 ft. high and turning an aerial somersault, and again racing in circles. How long the performance had been going on before I happened to become a spectator I know not, but it went on under my eyes for perhaps seven minutes, during which time the blackbird never stirred and the stoat continued in violent movement. Every moment I expected that it would spring upon the bird, which it might easily have done, but nothing of the kind happened. Suddenly, in the middle of the

performance, the blackbird flew away; and the stoat, apparently not caring to exhibit without a 'gallery,' resumed its normal gait and disappeared in the bushes.

"Now if the blackbird was 'fascinated' in the sense of an arrest of motor volition, what broke the spell? The acrobat was at the height of its antics when the bird flew off. One may assume, I think, that the latter's interest in the performance was absorbing up to a certain point, for it is contrary to the habits of a blackbird to sit motionless for many minutes on a spring morning; but it does not seem as if its volition had been affected.

"In his great work on British mammals, Mr. J. G. Millais describes instances of the stoat (than which there is no more bloodthirsty animal) resorting to these acrobatic feats with no deadly purpose, finishing up by romping with its audience of young rabbits and worrying them in make-believe. In the case I have described it does not appear that the stoat had any intention of making its breakfast off the blackbird."

Vide letter of Prof. E. B. Poulton, D.Sc., F.R.S., at p. 486, *Nature*, Feb. 20, 1919.

That Blind-worms, or Slow-worms, are Blind and Poisonous, and are Worms or Snakes

This is indeed a congeries of errors, for they are *not* blind, they are *not* poisonous, they are *not* worms, and they are *not* snakes! The case is thus very similar to that of the crab, which on a celebrated occasion was defined as "a little red fish that walks backwards," a description which Cuvier said was admirable, except that a crab was *not* red, *not* a fish, and did *not* walk backwards!

The blind-worm is perfectly harmless, on the authority of Gilbert White, the Rev. J. G. Wood, and the *Cent. Dict.* They are not blind, on the authority of Prof. T. Rymer Jones, F.R.S., the *Cent. Dict.* and *Pannell's Ref. Book.* They are not worms, on the authority of Prof. Rymer Jones. They are not snakes, on the authority of the Rev. J. G. Wood, Prof. Rymer Jones, the *Cent. Dict.* and *Pannell's Ref. Book.*

With so many negatives the reader will wonder what they are; well, they are lizards. The reason for classing them as lizards being because they have rudimentary pelvic and shoulder girdles, small eyes with *movable* lids (the eye-

lids of snakes are not movable), and some say rudimentary limbs under their skins.

" The slow-worm, or blind-worm (*Anguis fragilis*) is found over the greater part of Europe, and the adjacent parts of Asia ; and it is common in many parts of England, frequenting copses, orchards, old mouldering walls, and banks where it delights to bask in the sun ; it is a sluggish, timid creature, and when handled, even roughly, seldom attempts to bite. If it does, its jaws are too small and feeble, and its teeth too minute to inflict a wound ; scarcely, indeed, does it make an impression, and the opinion that it is venomous is as absurd as it is erroneous. Let those who believe it put it thus to the test, examine the creature's teeth, try their effect on any small animal, and not give up their common-sense to the assertions of the ignorant.

" It is not blind, but has small, bright and quick eyes."—*The Royal Nat. Hist.*, edited by James Wylde.

The Rev. J. G. Wood, F.L.S., says in *Common Objects of the Country* :—" The names that are given it are hardly in accordance with its formation, for it is not very sluggish in its movements, although it can be easier taken than the lizard ; while it is anything but blind, and its eyes, though small, are brilliant. Perhaps the epithets ought to have been applied to the givers and not to the receivers."

This little creature is also called a deaf-adder, though it is *not* deaf, nor is it an adder !

It is also known as a " slow-worm," " orvet," and Aberdeen snake.

It is said that Shakespeare rarely made technical mistakes, but he did so in the case of this so-called " blind-worm," for he referred to it as the " eyeless venom'd worm " [*Timon of Athens*, IV., iii., 182.], thus making three mistakes in three words, (!) while in *Macbeth* [Act IV., Sc. 1, line 16] he says, " Adder's fork, and blindworm's sting," when in fact the blindworm has not any sting.

That a Glass Snake is a True Snake

It is a large, limbless lizard (*Ophiosaurus ventralis*), abundant in the southern United States, and so called from its general resemblance to a snake and the extreme fragility of its tail, which, fortunately, grows again, to some extent, after it has been broken off.

Other instances of legless lizards which are very naturally mistaken for snakes are the blind or slow-worm, and the scheltopusik (*Pseudopus*).

Two features which distinguish a lizard from a snake are the general shape of the head ; and the eyelids, for the latter in the case of lizards are true eyelids, *i.e.*, they are movable, and are used.

That the bites of boa-constrictors and pythons are poisonous

Boas and pythons have no poison fangs, and are therefore harmless so far as poisonous bites are concerned, but this scarcely makes them—or more particularly the boa—less terrible foes, for they coil round their prey and crush it to death.

That Crocodiles Shed Tears

" As the mournful crocodile
With sorrow snares relenting passengers."
Henry (2) VI., iii., I., 226.

" If that earth could teem with woman's tears
Each drop she falls would prove a crocodile."
Othello, iv., I., 236.

The origin of this erroneous idea seems to have been some traveller's tale and it is remarkable how popular it became, and what a number of leading writers have vested it with importance by referring to it :—

" Cæsar will weep, the crocodile will weep,
To see his rival of the universe
Lie still and peaceful there."
Dryden, *All for Love* (1678).

" Hast thou marked the crocodiles weeping ? "
Sir John Suckling (c. 1640).

" Crocodiles wept tears for thee."—Tennyson, *The Dirge*.

" It is the wisdom of crocodiles that shed tears when they would devour."—Bacon, *Essay* XXIII.

There are at least two other fallacies in connection with crocodiles, viz., that their upper jaws are moveable, and that they have no tongues. The reason for the former is apparently because the lower jaw is prolonged beyond the base of the skull and thus causes the upper jaw to seem moveable. The tongue is flat, and free only at the very edge, so that in making a *hasty* examination of a crocodile's mouth (such as one can easily imagine an unarmed traveller doing !) it

is not surprising the tongue was overlooked. These additional fallacies are also referred to by several old writers :—

" The Crocodile is a serpent that from a small egg grows in short time to a mighty length and bigness ; he is bold over those that fly him, but fearful of them that pursue him ; . . . he hath no tongue, but teeth sharp and long ; neither in feeding doth he move his lower jaw."—Thos. Heywood, *London's Peaceable Estate* (c. 1640).

" It is said that among beasts only the Crocodile moveth the over jaw. Among beasts of the land he is tongueless, and his biting is venomous ; . . . If the Crocodile findeth a man by the brim of the water, or by the cliff, he slayeth him if he may, and then weepeth upon him, and swalloweth him at the last."—Bartholomew (Berthelet), book xviii., § 33.

" His nature is ever when he would have his prey to cry and sob like a Christian body, to provoke them to come to him, and then he snatcheth at them ; and thereupon came this proverb that is applied to women when they weep, *Lachrymæ crocodili*, the meaning whereof is, that as the Crocodile when he crieth goeth then about most to deceive, so doth a woman most commonly when she weepeth."—Master John Hawkins' *Second Voyage, apud* Hakluyt, p. 534 (1598).

" The Crocodile runneth away from a man if he wink with his left eye, and look steadfastly upon him with his right eye."—Topsell, pp. 683-92, *History of Serpents*.

That Chameleons Live on Air

KING.—" *How fares our Cousin Hamlet ?*
HAMLET.—*Excellent, i'faith ; of the Chameleon's dish : I eat the air, promise—crammed : You cannot feed capons so.*"
Hamlet, III., ii., 91.

" *Though the chameleon Love can feed on the air, I am one that am nourished by my victuals.*"
Two Gentlemen of Verona, II., i., 161.

" *He is a kind of chameleon.*
That hath more mind to feed on your blood than live in your air."
Ibid., II., iv., 24.

" *Cameleons feed on light and air ;*
Poets' food is love and fame."* Shelley.

Dealing with this fallacy, Mr. Frank Gibson, *Superstitions about Animals*, p. 84 :—" Need it be said that whatever be

* The earthly and practical P.D. made this line in the proof end with " game " !

the nature of a poet's food, chameleons require something a little more substantial than air for their sustenance—a juicy fly, or a tiny luscious beetle is more suited to their dietary."

That Snakes are Slimy

" The slimy serpent swelters in its course."
Chatterton.

" If like a snake she steal within your walls
Till the black slime betray her as she crawls."
Byron.

" There is an aspic's trail, and these fig leaves
Have slime upon them, such as the aspic leaves
Upon the caves of Nile."
Shakespeare, Antony and Cleopatra V., ii. (17 lines from the end)

" People who have never had the pleasure of handling the reptiles insist that they are ' slimy.' This is a great mistake, and is as much a slander as if the snakes were to contend that such people never washed themselves. I have handled numerous snakes, but have not yet found one that was ' slimy.' "—F. Gibson, p. 95, *Superstitions about Animals.*

The author too has handled snakes, but he cannot own to much pleasure being derived from the process. He usually took the precaution of killing the snake first ! To do them justice, however, he has pleasure in confirming that they were *not* slimy, but very smooth.

That Snakes of the Boa Constrictor Type Cover their Prey all over with Saliva before Swallowing it

" Many years ago it was the custom of the Society to feed the reptiles in public every Friday evening. At that time it was usual to place live goats, rabbits, fowls, and so forth in the cages of the larger snakes, and Charles Dickens and other writers have left vivid descriptions of the public interest in what must have been an unpleasant spectacle. For more than ten [in fact, thirty] years, however, the house has been closed at feeding time. A notice has now been placed in the Reptile House that feeding will take place on Friday evenings at 6, and on last Friday this experimental arrangement began.

" Only freshly killed prey is given. The poisonous snakes, such as cobras and puff-adders, generally strike at the dead rats or mice as soon as these are thrown into the cage, but sometimes the bodies have to be dangled in front

of them, offered and withdrawn several times. After striking, they withdraw at once, and begin the process of swallowing some time after, seizing the prey indifferently by any portion of the body. The large non-poisonous Colubrine snakes, and constricting snakes such as pythons and boas, if they are hungry, seize the prey with a sudden rush and then throw a coil of the body over it; if any attempt is made to draw it away (representing the movement of a living animal) coils are thrown round the carcase. After a time the prey is released, and the snake moves over it, playing on it with its forked tongue, but not, as is generally supposed, covering it with saliva. The head end is carefully selected for the process of swallowing, and it is in course of this that saliva is freely poured out."—*The Times*, July 17, 1911.

Prof. T. Rymer Jones, F.R.S., gives (p. 293, *Animal Creation*) a detailed account of the somewhat laborious process of feeding as practised by boa constrictors, but he does not mention saliva.

The saliva story was also denied by a writer in the *Sydney Mail*, 1921.

That Snakes Love Music and are "Charmed" by it

"Barnard concludes from his personal observation of cobras in Ceylon that the serpent's traditional love for music is a pure fable, and that the only effect of music is to arouse the reptile's curiosity, which is excited by any loud and acute sound. The cobra protrudes its head from its burrow alike on hearing the snake charmer's flute, the rattling of a chain or the sounds made by beating the ground with a switch. It appears to perceive only sounds of high pitch, for it pays no attention to the low notes of the flute or the beating of a drum. Barnard also confirmed, in Ceylon, the results of observations made in the London zoological garden on the supposed power of fascination exerted by serpents upon birds, and he concludes that this power of fascination is also purely imaginary."—*Scientific American*, Sept. 17, 1910.

In 1822, my great grandfather, Rudolph Ackermann, of the Strand, published six little volumes on Hindoostan, forming part of a series, *The World in Miniature*. An article on "The Snake, Charmer" starts at p. 65 of Vol. VI. At p. 68, *et seq.*, we read:—

" Some new light has been thrown on this curious subject. A company of English, who were rather incredulous respecting the secret charm which both natives and Europeans in general suppose these people to possess for making the reptiles obedient to their wills, not long since sent for three of these serpent-tamers, and desired them to clear a certain place of serpents, which they were to kill as fast as they caught them. With the latter direction the sorcerers absolutely refused to comply [Note this carefully.—Ed.], alleging that they had promised the serpents that no harm should be done to them if they would suffer themselves to be caught quietly. After they had begun their singing, by which they were supposed to charm the animals, they walked over the prescribed space, till the foremost of them came to a small outhouse, which, as the servants declared, was the haunt of a serpent of extraordinary size. He placed himself before the door and continued his song, till the reptile could not help darting from its retreat—at least so it appeared—and was instantly seized by the singer. This was done so suddenly that not one of the company could set eyes on the snake, though it was very large, till it was actually caught ; for the conjurer made such an abrupt spring at the very moment when, as he said, the snake was coming out, as to prevent the spectators from observing how the reptile issued from its lurking-place. The man wore a kind of long robe which reached to the ground ; it was imagined that he might have tame serpents secreted in this garment ; and it was therefore thought advisable to make him pull it off before he and his colleagues proceeded to another experiment. This unexpected requisition threw him into manifest embarrassment. Before he made another essay, his employer desired him to put down the serpent which he had caught by the side of a basket, into which it immediately crept, as if quite familiar with that kind of habitation.

" After his two companions had likewise stripped off their robes, they again went about singing as before, but not a serpent would make its appearance. Having continued this farce for about an hour, finding that their trick was partly discovered, they frankly explained their method of operation, and the account was afterwards confirmed by others of the same profession. It hence appears that they constantly carry with them tame serpents of all kinds, of which they conceal as many as they have occasion for in

the skirts of their long robes. If they are shown the hole of a serpent, they take care to inquire if any person has seen it and of what species it is. If nobody has seen it so much the better ; but if it is described as being of a particular kind, they provide themselves with a tame serpent of that kind ; and after they have performed their incantations as long as they deem it necessary, they force it to come out by squeezing its body. At this moment they cry aloud that the snake is coming out of its hole, make a sudden movement as if to seize it, and in this manner prevent the spectators from observing how it is drawn forth from their robe. They then exhibit the reptile to the astonished spectators as being the same which dwelt in the hole, but which they have rendered harmless.

" After this explanation they showed the pockets in the skirts of their robes in which they kept the tame serpents. Some had also a purse in which the snake coils itself up and from which issues at the well-known signal of its master. For this scandalous imposture they are paid according to the size and dangerous nature of the serpents which they pretend to have caught, and this practice is the more mischievous, since the inhabitants of a district which they pretend to have cleared of serpents are the more frequently bitten, because they fearlessly approach places which they would otherwise have avoided as the retreat of those venomous reptiles."

The Rev. G. C. Bateman, *The Vivarium* :—" I think the general belief that snakes can be charmed by music should be added to the list of fallacies about them. Snakes have no exposed ears, and, seemingly, their powers of hearing, like their powers of sight, are very limited. When a piccolo was played softly and shrilly before a case containing snakes, neither the music nor the noise made any impression upon them as far as I could see."

This subject has caused Mr. Donald Gunn to put forth his maximum effort, if one may estimate this by the number of 4to MS. pp. he sent me, for there are *eleven* such, and he ends thus, " I have not knocked this into shape, as it is too verbose. You may be able to centrifuge something from it." He also states, " So far as I know, nothing has been done to settle it by experiment." The following is the result of centrifuging :–

Sir E. Tennent tells a story, told to him by a P.W.D. official, of a professional snake charmer who was taken into

the jungle to catch a (known) cobra. The year was 1854. " When we arrived at the spot he played on a small pipe, and after persevering for some time out came a large cobra from an ant hill that I knew it occupied. On seeing the man it tried to escape, but he caught it by the tail, and presently made it dance." This, from the *Cambridge Natural History*, is another story that, like Col. Campbell's, is quite definite about the capture of a wild snake brought out into the open by piping. There are many other such, but nearly all are, at best, second hand, as is this one. Commenting on the above, G. J. Romanes, F.R.S., in his *Animal Intelligence*, says, " The only remarkable thing about it seems to be that the charmer is able to make a freshly caught snake ' dance '— for the fact of the snake approaching the unfamiliar sound of music is not in any way more remarkable than a fish approaching the unfamiliar sight of a lantern. It does not, however, appear that this dancing is anything more than some series of gestures or movements which may be merely the expression of uneasiness or alarm." Mr. Gunn remarks, " I agree with Romanes in belittling the ' dancing,' but the reaction to music is, to my mind, very wonderful, if it is true. I don't think it is true, but a matter so easily tested should not be in doubt in 1919. It it were shown, as I believe it could be, that instrumental music is a modern addition, and that all stock tricks could be (and at one time were) worked by means of the voice alone, or in conjunction with spittings, etc., then your question is answered. . . . It seems to me that the only people who accept the power to charm and the power to charm by music are the uncritical wonder-loving public. Scientists attacking the problem from several sides are unanimous that there is no such thing as a power of this kind."

That Tortoise-Shell is obtained from Tortoises

" Tortoise "-shell is obtained from the large scales of the carapace or shield of the *Caretta imbricata*, a species of sea-turtle. The error has arisen from the fact that the order to which this animal belongs was formerly little known, and all were called tortoises. A peculiarity in *Caretta imbricata* is that the 13 plates forming the carapace, instead of being joined together by their edges, so as to make apparently one piece, are thinned off at their edges, and overlap one another like the tiles of a roof. The material is also obtained from the Hawksbill turtle—*Chelone imbricata*.

That a Spider is an Insect

An insect is a small invertebrate animal having its body divided (hence the derivation of the word *insect*) into three sections, the head, thorax, and abdomen, with six legs attached to the thorax and usually two or four wings, or two wings and two wing cases.

A spider has eight legs and no wings ; belongs to the order *Araneida*, class, *Arachnida ;* and is not therefore an insect.

That the Bite of a Tarantula Spider is very serious, that it can be Cured only by the Wild Tarantula Dance or tarantella, and that the tarantula is the Only Venemous Spider

" The Tarantula (*Lycosa tarentula*), so called from the City of Tarentum, in Italy, where it is common, has obtained great celebrity. It is there commonly believed that its bite is very serious, being sometimes fatal, or if not, that it occasions a peculiar malady called ' Tarentism,' only to be cured by music and dancing. Enlightened and judicious persons are of opinion, however, that it is the effect of imagination that requires thus to be combated, rather than the venom of the Tarantula."—T. Rymer Jones, F.R.S., p. 148, *Animal Creation.*

Sir Ray Lankester, K.C.B., F.R.S., writing in the *Daily Telegraph*, April 23, 1914, stated that :—

" The whole story of the ' Tarantula '—a fairly large spider common in Italy and known to naturalists as *Lycosa tarentula*—which receives its name from the town of Taranto, is now discredited. It was believed that the bite of this spider caused a peculiar sleepiness and also painful symptoms in men and women, only to be cured by music, which set the bitten victim dancing. The dance was called the ' Tarantella.' Goldsmith, the delightful writer of stories and plays, declared in his *Animated Nature* that the whole thing was an elaborate imposture on the part of the Tarantese peasants who, for a fee paid by a credulous traveller, would be bitten, simulate apparent collapse, and then pretend to be restored by music and the violent dancing of the ' tarantella ' which they declared they felt mysteriously compelled to perform. It was supposed that the sweating caused by the exertion freed the body of the poison."

In writing of spiders in general, T. Rymer Jones, F.R.S., p. 140, *Animal Creation*, states that : " . . . . when the

spider bites, a venomous fluid of great potency is instilled into the wound inflicted. Such indeed is the malignity of this poison secretion, that its effects in destroying the life of a wounded insect are almost instantaneous, and in the case of some larger species, even small birds fall victims to its virulence."—*Vide* C. Warburton, pp. 68 and 75, *Spiders*.

That a Rattle-Snake cannot help Rattling his Rattle when Moving Along

" With respect to the rattling of the rattle-snake, we have at last some definite information : for Prof. Aughley states (p. 85), *The American Naturalist*, 1873, that on two occasions, being himself unseen, he watched from a little distance a rattle-snake coiled up with head erect, which continued to rattle at short intervals for half an hour : and at last he saw another snake approach, and when they met they paired. Hence he is satisfied that one of the uses of the rattle is to bring the sexes together. Unfortunately he did not ascertain whether it was the male or the female which remained stationary and called for the other. But it by no means follows from the above fact that the rattle may not be of use to these snakes in other ways, as a warning to animals which would otherwise attack them. Nor can I quite disbelieve the several accounts which have appeared of their thus paralysing their prey with fear."—Charles Darwin, p. 541, *The Descent of Man* (1901).

Dr. John Jones at p. 173 of his *Medical and Vulgar Errors* (1797) refutes this in these words, " This is so far from being the case, that the snake, in its ordinary motion, is not heard to rattle at all ; the rattling being only excited at will by the snake, for the sole purpose of frightening hares, squirrels and birds, out of their bushes and hiding places, to become its prey." *Ency. Brit.* supports this view as regards the snake having deliberately to shake its tail to sound the rattle, and further states that the special purpose of the rattle is not known.

Vide *Nature*, April 21, 1921, p. 245.

That Alligators Attack Man

Sir Harry H. Johnston, K.C.B., D.Sc., the explorer of Africa and South America, had a characteristic article, *The Disillusionment of Inaccuracy*, in the *Cambridge Magazine*, of Feb. 9, 1918, and at p. 394, we read, " I take up the Christmas

Number of the *Strand Magazine* to find its leading sensational story is based on the 'alligators' of a New Guinea swamp horribly devouring a white man. Alligators in the first place do not attack man, and are only found in the rivers of China and North America. The author of this story might exclaim: 'Well, but hang it all, I meant crocodiles.' Then why not say so?"

In the *Cambridge Magazine* of Feb. 23, 1918, Sir Harry replied to the correspondence he had received on the above named article, and said: "An anonymous correspondent states that he is Indian-born, of English parents and grandparents, and knows India 'like a book.' Therefore, when he asserts that Indian waters teem with 'alligators,' that these alligators *do* devour man, and further that their name is 'muggur' in the vernacular, I, only knowing India 'by hearsay,' am to believe him and humbly retract my repudiation of a man-eating, Asiatic alligator. . . . As a matter of fact, I have travelled in India somewhat considerably; but even if I had not, an elementary acquaintance with the facts of zoographical distribution would have taught me that the 'magr,' the man-eating crocodile of Indian rivers and tanks, is either *Crocodilus palustrus* or *C. porosus*, and that the only alligator in Asia or the old World is the little alligator (at most six feet long), which is still found in the Yang-tse-Kiang river in Central China: a creature which, like the closely related alligator of sub-tropical North America, is *not* dangerous to man."

That a Snake Moves from Place to Place by a Wave-like Motion of its Body in a Vertical Plane

The locomotion of a snake would be more correctly described by saying it was a wave-like motion in a *horizontal* plane: a sort of wriggle from side to side as it finds small fixed objects by means of which it can give itself a push forwards. Snakes are not able to move over a perfectly smooth surface.

For a more detailed explanation of the motion, vide *Ency. Brit.*, "Snakes."

That Snakes Can Jump Completely off the Ground, especially when Striking

"The notion that snakes when attacking are able to jump off the ground is quite erroneous; when they strike

an object, they dart the fore part of their body, which was retracted in several bends, forwards in a straight line. And sometimes very active snakes, like the cobra, advance simultaneously with the remainder of the body, which, however, glides in the ordinary fashion over the ground; but no snake is able to impart such an impetus to the whole of its body as to lose contact with the ground."—*Ency. Brit.*, Vol. 22, p. 190.

That Adders are Deaf

" What, art thou, like the adder, waxen deaf ? "
Henry VI. (2), III., ii., 75.

" For pleasure and revenge,
Have ears more deaf than adders to the voice
Of any true decision."
Troilus and Cressida, II., ii., 171.

" Like the deaf adder that stoppeth her ears."—Ps. LVIII., 4.

There is some justification for this belief—indicated by the simile " as deaf as an adder "—for the sight and hearing of snakes as a class are poor, their senses of smell, and of touch by their bifid tongue, coming most into use, but adders are no more deaf than any other snake.

That Tortoises are Useful in Gardens

" There is a prevalent idea that the tortoise is useful in a garden in order to eat up insects. This is quite a mistake. The ordinary tortoise is a strict vegetarian, . . . "—Harry Havart, *The Back Garden Beautiful*, p. 85.

In the *Harms. Ency.* we find, " The Greek tortoise, so often kept in confinement in Britain, is an example of a land tortoise, and is herbivorous, while the pond tortoises live on purely animal diet."

Prof. T. Rymer Jones, F.R.S., also states that the land tortoises live exclusively on vegetables.

That Toads do Harm in a Garden

Mr. Harry Havart, p. 79, *Back Garden Beautiful*, says :— " Another real friend in the garden is the toad, which, however, is rarely seen in or near the centres of large towns. As a matter of fact, its presence usually indicates dampness and bad drains, . . . In a garden, however, a toad or two does no harm at all, but good, as the little creatures exist

on insects, and not, as is mainly supposed, upon leaves and plants."

Prof. T. Rymer Jones, F.R.S., agrees that they are insectivorous.

That the Indian Cobra is the most Venomous Snake

Mr. Noël Deerr, F.C.G.I., F.I.C., the Chemist and well-known authority on sugar, who has spent much of his life in hot countries, states that the Indian sea-snake is far more deadly, and that calculated on the dry weight of poison, the relative virulence is sea-snake 11, krait 7, cobra 4, Russell's viper 1.

That the so-called Bird-Eating Spiders Kill and Eat Birds

Mr. Richard Hancock wrote on Oct. 4, 1922 :—

"With regard to the Mygale or Bird-eating Spider I personally do not think it possible for any, even the large kinds, to capture, kill and eat birds though they be of the Humming Bird variety. As a matter of fact I have frequently handled them without their attempting to bite me. I have one at the present moment. Only on one occasion have I been bitten through handling one too roughly and I felt no ill effects."

Mr. J. Gardner, Naturalist, was reported in the *Evening Standard*, Sept. 18, 1922, as follows :—

"Although the insects are called bird-eating spiders, they really feed on locusts and tree bugs, and only occasionally do they get very small birds, which, no doubt, have been wounded and incapable of defending themselves.

"They are poisonous, but their bite is much more likely to have serious effects in the tropics than in our climate. Their average size is about six inches from the tip of one leg to the other."

Vide *Spiders*, by Cecil Warburton, pp. 25, 89, 99, 131.

That there is no Life in the Great Abysses of the Oceans

"It is not surprising, then, that in the progress of knowledge mistakes have been made and corrected, and that views have been held on what seemed good scientific grounds which later on were proved to be erroneous. For example, Edward Forbes, in his division of life in the sea into zones, on what then seemed to be sufficiently good observations in

the Ægean, but which we now know to be exceptional, placed the limit of life at 300 fathoms, while Wyville Thomson and his fellow-workers on the *Porcupine* and the *Challenger* showed that there is no azoic zone even in the great abysses."

Sir W. A. Herdman, D.Sc., D.Ph., F.R.S., Presidential Address to the Brit. Assoc. *Nature*, Aug. 26, 1920, p. 816.

That Pigeons, Ducks, Rabbits, and Goats are Terrified by the Sight of Pythons and Boa-Constrictors

" Contrary to popular opinion, pigeons, ducks, rabbits, and even goats, when placed with these formidable reptiles, display no sign of fear, but move about in the most unconcerned way, until they are suddenly seized and killed instantaneously and painlessly as could be done by man."

P. Chalmers Mitchell, M.A., D.Sc., F.R.S. ; *Official Guide* to the ' Zoo,' 5th ed. (1907), p. 70.

A similar note appears at p. 68 of the 21st ed., 1923, where it is added, " On the other hand, when snakes are hungry and the temperature is sufficiently high, they will take dead prey as readily as living prey, and for many years they have been fed in this way at the London Gardens."

Almost any day at the ' Zoo,' live frogs and sparrows may be seen close to the vipers in the open-air enclosure. The sparrows obviously can and do fly right away when they want to, and the frogs could get much further away, but they don't bother. Probably some regret this laziness later !

That some Large Snakes have Horns

" Monstrous lies grow sometimes from a grain of truth, and so do colossal horned snakes in Brazil. Their size at least is proved by a cunning mixture of circumstantial evidence and further reflection : for instance, the discovery by trustworthy hunters that the so-called horned snakes are really not horned creatures, but such as have swallowed an ox tail foremost, the spreading horns ultimately lodging crosswise in the corners of the mouth—quite a sufficient explanation in countries where anacondas are said to grow to 40 metres in length."—*Nature*, April 8, 1920, p. 160.

That the Australian Barking Spiders do in fact make a Noise like Barking

" Sometimes sounds have been quite wrongly attributed to spiders ; there is, for example, an Australian species widely

known among natives as the ' barking ' or ' booming ' spider, for no better reason than that the spider has been found in the daytime at a spot where booming was heard at night. This case was investigated by Prof. Baldwin Spencer, who found that quails were really responsible for the sounds with which the spider was credited. The creature could, however, achieve a kind of whistle by rubbing its palps against its mandibles."—Cecil Warburton, M.A., p. 107, *Spiders* (1912).

That the Bites of the Malmignate, the Vancoho, the Katipo, and the Queue Rouge Spiders are very Dangerous

" All over the world there are certain particular spiders whose bite is especially feared. Among them are the ' Tarantula ' and the ' Malmignate ' of southern Europe, the ' Vancoho ' of Madagascar, the ' Katipo ' of New Zealand, and the ' Queue rouge ' of the West Indies. . . . . Circumstantial accounts of deaths from the bite of a spider are countered by the assertions of experimenters that they have allowed themselves to be bitten repeatedly by the same species without suffering any inconvenience. There is at all events some basis for the popular view in the fact that all spiders possess a poison gland . . . . It is probable that their deadly powers are almost entirely fabulous."—Cecil Warburton, M.A., p. 75, *Spiders*.

That Gossamer is in some way Produced by or from Dew

" The phenomenon known as ' gossamer ' has puzzled people for centuries, and English poetical literature is full of allusions to it. Chaucer classes it with ' ebbe and floud ' as an unsolved riddle, and Spencer, Quarles and Thomson all make mention of it, generally embodying the popular belief that it somehow had its origin in dew . . . . Our observations will have given a clue to its origin which is entirely attributable to spiders, and in large manner to their ballooning habit . . . ."—Cecil Warburton, M.A., p. 36, *Spiders*.

That the " Harvest Spider," " Little Red Spider " and Sea-Spider are True Spiders

They are not according to Mr. Cecil Warburton at pp. 2, 3 and 8 of *Spiders*. " A harvest man, for instance, lacks the waist, and its abdomen is segmented . . . . at least

two pairs of legs [of mites, to which the 'little red spider' belongs] will be found attached to the hinder portion; and neither harvestmen nor mites possess the spinnerets which are the most striking characteristic of the spider . . . ." And at p. 47, "There are even some weird creatures called Sea-spiders (Pycnogonids), but these do not concern us, for they are very far removed from the true spiders."

That in the case of all Spiders the Female Eats her Spouse when she considers she has no further need of his Services

"The peculiar marital relations of the Epeiridæ are often —quite wrongly—attributed to the whole tribe of spiders A male garden-spider courts the female at the risk of his life . . . But with *Agelena* [Not Angelina !] the conjugal relations are exemplary, and harmony reigns at home."—Cecil Warburton, M.A., p. 40, *Spiders*.

That the Common Garden-Spider does not Repair its Web

Mr. Richard Hancock, writing on Jan. 15, 1923, said:—"With regard to orb-weavers they bite out the outer spiral lines and replace them with new ones and generally they will repair their web when damaged by insects rather than make a new one. I have several photographs showing this taken during periods of hoar frost."

"M.R.," writing in the *Daily Mail*, Sept. 22, 1919, said:—"He certainly *does* repair his web."

That a Spider's Thread is Woven of Hundreds of much smaller ones

"Epeira has about 600 of such glands, each with its own terminal spool or spigot, and the large number of these tubes has given rise to a misconception that is very widely spread—namely that the spider's line, fine as it is, is 'woven' of hundreds of threads of very much finer silk. This is not so, as we should presently see."—Cecil Warburton, M.A., p. 111, *Spiders*.

VEGETABLE KINGDOM

That "Mummy Wheat" will Grow

"MUMMY WHEAT" is the name given to the wheat found in the pyramids of Egypt, and which is, therefore, some thousands of years old.

"The vitality of seeds is very variable as to duration. Amongst instances of short-lived seeds are acorns, which germinate at once, and maple seeds. As a proved instance of long-lived ones, the sacred bean of India is the most authentic; one such taken from a herbarium upwards of 100 years old having germinated.

"Wheat is said to keep for seven years at the longest. The statements as to mummy wheat are wholly devoid of authenticity; so are those as to the raspberry seeds taken from a Roman tomb. On the other hand, that seeds may remain buried alive in the soil for many years is rendered most probable, by the fact of charlock and broom appearing suddenly and in quantities in newly-turned up soil that had not been disturbed for long periods. It is, however, difficult to believe that such a moist complex substance as living protoplasm can resist chemical change sufficiently long to favour the idea that seeds have lain buried alive for many hundred years."—Sir John D. Hooker, P.R.S.

Mr. C. E. Clark, in his *Mistakes We Make*, deals thus with this fallacy:—

"MUMMY WHEAT.

"There is the belief that 2,000 years' old wheat will come to life. Mummy wheat will not grow except in the estimation of certain credulous folk, chiefly tourists. The stories of wheat found inside sarcophagi and mummy cases germinating after thousands of years have been proved unauthentic times out of number by Hooker, Carruthers, Flinders-Petrie, Newberry, and every other botanist and antiquary of any eminence, and likewise by committees of the British Association and the United States Department of Agriculture. Wheat seldom preserves its vitality beyond the eighth or ninth year. In the *Standard* lately appeared a letter from Mr. Newberry, who therein says that out of the

seeds of thirty species of plants found by him in similar situations, not one sprouted. His latest failure was three peach stones—probably of Roman date—disinterred from a tomb at Beni Hasan, in Upper Egypt. The fact is the seeds, like the mummies, have been oxidised to the very centre, and the chances of renewed growth are, therefore, about as problematical as the discovery of favourable conditions for revivifying defunct Egyptians. At the South Kensington Health Exhibition there was shown a model of the Roman baths uncovered at Bath, and in the centre the present writer remembers seeing a large seed pan filled with ferns, to which was attached a label stating that they were grown from seeds (spores) obtained from fern leaves during the excavations, and found so many feet under the Roman ruins, where they had lain so many hundreds of years—and the public believed it!"

"Sir Ernest A. Wallis Budge, D.Lit., F.S.A., Keeper of Egyptian and Assyrian Antiquities at the British Museum, has once and for all nailed the fallacy of this 'hardy annual' to the counter. He says, 'People have heard that wheat found in tombs will grow, and as the wheat found there does grow when planted, they believe it, quite ignoring the fact that the wheat which grows is not ancient Egyptian wheat at all.

"'The explanation is this: From the Arab times downwards the hall of a rock tomb was a dry, secure place to store grain, as are also stone sarcophagi, wooden coffins, and earthenware vases. All the wheat found in them, which grows when planted, is modern, and is, I believe, in addition, never more than five years old. Where there is no sawdust to be had, or chopped straw, grain makes excellent temporary packing for mummies, and as this grain when done with can be sold for donkeys' food, there is little loss. Some ancient wheat has been found, but this has never germinated.'"—*Antiquary*, Nov., 1894, p. 185.—*Daily Mail*, June 30, 1909.

An account of the attempts to get wheat found in Egyptian tombs to germinate was given in *Knowledge* of March, 1913.

That Orchids Live on Air

Air consists of about 79 per cent. by volume of nitrogen, and 21 per cent. of oxygen, besides traces of other elements and some compounds. An example of the former is argon; of the latter, carbon dioxide (4 vols. in 10,000), ammonia, and aqueous vapour (1·4 per cent.) are the most important.

Now for a plant to grow, its roots *must* be supplied with the following elements, in some form or other, besides water, viz. :—potassium, calcium, magnesium, iron (a trace),nitrogen, sulphur, and phosphorus. Carbon, which enters so largely into the composition of vegetable matter, is obtained by the plant from the carbon dioxide in the atmosphere, and this is the *only* substance which the vast majority of plants are capable of obtaining from the air. The only other substance which a few plants can obtain from the air is nitrogen, and the plants which have this power belong to the Order *Leguminosæ* (peas, beans, lentils, etc.) ; though even in this case it is an indirect power, for it depends on certain bacteria being present on the roots of these plants. Hence, as the atmosphere does not contain all the elements which are *essential* for the growth of a plant, it is clear that orchids cannot " live on air," though, being bulbous, they might live on their store of nourishment for a little while, just as a potato will sprout if kept in a moist atmosphere. A young couple might as well try to " live on love," as a plant on air ! When impecunious Edwin was about to marry Angelina he was asked by a more prudent friend whether they intended to " live on love." " No," replied Edwin, " but on my love's father."

Some Fallacies connected with the Vegetable Kingdom

Why are Jerusalem artichokes called by that name ? They are never seen in the Holy Land—will not even grow there—and the root-flavoured vegetable would hardly appeal to the taste of the people of Palestine. Neither are French beans French ; they come from South America. Rosewood is not the wood of any kind of rose-tree. It is obtained chiefly from various Brazilian trees, especially *Dalbergia nigra*. The name is due to the faint smell of roses when some varieties of the wood are freshly cut. Many other countries besides Brazil produce timber which is called rose-wood. The business part of black-lead pencils is not lead, any more than is the blacklead with which grates are cleaned. It is carbon in one of its purest forms, as different from lead as milk is from chalk ; though, in saying this, we know some facetious people will assert that there is not always the difference between these two articles that there should be !

" Jerusalem " (artichoke) is a corruption of the Italian word *Girosole* (sunflower), of which the Jerusalem artichoke is a species (*Helianthus tuberosus*).

The Tuberose has nothing to do with " tubes " or " roses," but this common name is a corruption of its botanical name (*Polianthes tuberosa*).

That the Sunflower always faces, and turns with, the Sun

" The sunflower turns on her god, when he sets,
The same look which she turned when he rose."
" Irish Melodies." Moore.

" In the modern vernacular this name is most commonly applied to the various species of *Helianthus*, especially to *Helianthus annuus ;* but, as this is a tropical American herb, and the word ' sunflower,' or something corresponding to it, existed in English literature prior to its introduction, or, at any rate, prior to its general diffusion in gardens, it is obvious that some other flower than the *Helianthus* must have been intended. The marigold (*Calendula officinalis*) is considered by Dr. Prior to have been the plant intended by Ovid, Met., iv., 269-70.

" . . . *Illa suum, quamvis radice tenetur, vertitur ad Solem : mutataque servat amorem,*" and likewise the *solsæce* of the Anglo-Saxon, a word equivalent to *solsequium* (sun-following). But this movement with the sun is more imaginary than real, the better explanation being afforded by the resemblance to ' the radiant beams of the sun,' as Gerard expresses it.

" The so-called ' Jerusalem artichoke ' (*Helianthus tuberosus*) belongs to the same genus. It is believed to be a native of Canada, or perhaps a modified form of *Helianthus doronicoides.*"—*Ency. Brit.*

It is certain, as Gerard also says, that four sunflowers may be seen on the same stalk and facing the four cardinal points. Four flowers on separate stalks is a more convincing argument and this we have seen many times in this country and abroad.

" The fallacy that the flowers of the sunflower turn with the Sun is mentioned by Gerarde (1597), who adds ' the which I could never observe, although I have endevored to finde out the truthe of it.' "—*Chamb. Ency.* (1906).

According to heathen mythology, Clytie was a daughter of Oceanus with whom Sol (the Sun) became enamoured.

Later he despised her and she pined away in sorrow and was finally changed into a sunflower. This may be the origin of the popular idea.

The well-known bust of Clytie has a border of sunflower leaves.

That a Pumpkin is a Vegetable Marrow which has been picked and kept for a long time

It isn't! All that we can add to this convincing statement is that they both belong to the Natural Order (*Cucurbitaceæ*), of which the gourd, cucumber, melon, and water-melon are also species. The pumpkin is greenish when cut from the stalk, and it is kept in a dry place till it gets yellow, when it is sweeter. It is boiled and eaten like vegetable marrow; but when so boiled it is firmer, yellower, and has a stronger taste than the latter. It is eaten a good deal in South Africa.

That Mistletoe grows only on Oak Trees

It grows on many different kinds of trees, but chiefly on apple trees, and very rarely on oaks. Possibly, it is usually removed from apple trees, while it is left unmolested on other trees, and hence the origin of the fallacy.

Sir Ray Lankester, K.C.B., F.R.S., at p. 54 of his *From an Easy Chair* (1909), says:—"Our mistletoe is most commonly found parasitic on apple trees and poplar trees. It occurs on nearly all our trees, but is very rare on the oak. A careful inquiry some time ago resulted in the discovery of only seven oaks in all England on which mistletoe was growing."

That an Aloe lives 100 years before it flowers

On referring to the *Century Dict.*, under "*Agave Americana*," we find:—"It lives many years, ten to fifty or more, before flowering, whence the name *century plant*." It seems to us rather a stretch to call fifty years a century; it is equivalent to making an error of 100 per cent.! Furthermore it would appear as if Prof. Daniel Oliver, F.R.S., does not consider the American aloe (*Agave Americana*) to be a true aloe, for he refers to it as "the so-called American aloe." In South Africa, the African aloe flowers once in about twenty years, and there are aloes in the Scilly Isles which do the same.

In September, 1906, there was a fairly long account of aloes in general, because one was then flowering in the Zoological Society's Gardens in London, and this one was said not to have flowered for 100 years. On looking into the matter we found that the Zoological Society had not then been in existence 100 years, having been founded in 1826! Of course, it may be argued the aloe was on the site before the gardens, but this we think highly improbable.

That Beetroot Sugar is made from Red Beetroots

The red variety is the one commonly eaten as a vegetable, while the white one is practically unknown to the public. Hence the mistake, for it is the white variety which is called the sugar-beet. It is very sweet, and sugar is prepared from it on the Continent.

That Betel-nut is Chewed by Indians with the Leaves of the Betel Pepper only

The extent to which the betel, or areca, nut (*Areca catechu*) is used by Indians may be gathered from the fact that over 4,000 tons of the nuts are exported annually from Ceylon into India.

Sir Edwin Arnold's account of an Indian peasant and this practice is as follows, and as he was an authority on Oriental customs, we conclude that his is a correct report :—

"At the hour of repose his custom is to disengage from his turban and loin cloth a small bag with partitions, tied with a string. This he unrolls deliberately, and there is seen a layer of green leaves from the pepper vine, a lump of lime, two or three nuts of the areca palm, a few cloves, and an iron implement something like a nut-cracker. With this he breaks off some fragments of the aromatic nut, mingles them with a little of the lime, lays both in the hollow of a pepper-leaf, which he folds over and pins with two cloves, putting the whole medley into his mouth, and joyously chewing it."

The World for June, 1908, had a review of *The Book of Ceylon*, by H. W. Cave, M.A. (Oxon.), F.R.G.S., from which the following is an extract :—

"The habit of chewing betel-nut and leaves he will notice is universal. The method of preparation is to slice the areca-nut and then cut them into tiny pieces. A few

of these pieces, together with a small quantity of lime, are wrapped in a piece of betel leaf and placed in the mouth. The chewing of this mixture is said to be pleasant and soothing, and also to serve as a digestive for those who live entirely on rice and other vegetable foods. Betel chewing, however, colours the lips and teeth red, looking like blood-stains."

Mr. Bijaykumár Gánguli, B.A., Deputy Magistrate, of Hooghly, Bengal, writing on Sept. 21, 1915, said: "Sir Edwin Arnold's experience was confined, I believe, to the Bombay Presidency. In Bengal catechu is invariably used with the betel leaves, the catechu mixing with the lime gives the red or yellow hue to the medley when chewed. I referred to Principal Paranjpye of Poona Fergusson College and on Sept. 5, 1915, he replied as follows: 'We in this part [Bombay Presidency] also use the catechu with our *pan* [betel-leaves]. Some, especially the Gujeratties, use it powdered—and the Dakshnies—*i.e.*, the Marathi speaking people—chip a small piece off a big lump of catechu and put it in the *pan*. The leaf, betel nut, lime, and catechu are the invariable ingredients of *pan*.'

"It will appear from the above that the catechu must be added to Sir Edwin's list."

Mr. Amal Gánguli, writing from Calcutta on May 8, 1918, gives a similar account of the practice.

Thus we see it is an elaborate process, appearing as strange to us, perhaps, as the preparation of a salad and salad-dressing appears to an Indian.

That the Rose of Jericho really Revives when put into Water

The rose of Jericho, also called the resurrection plant, and the rose of the Virgin (*Anastatica hierochuntina*), is not a rose but is remarkable for the power the dried and shrivelled-up plant has of absorbing water and *appearing* to revive when placed in it. This action is due to the dry protoplasm in the cells becoming expanded, and thus causing the branches to straighten out in a similar manner to that in which a flaccid hose-pipe straightens out when water is forced through it.

The name (*Anastatica*) has reference also to the popular belief that the plant blooms at Christmas and remains expanded till Easter.

Sir Thomas Browne refers to this plant in *Tract I.* (p. 171 of Vol. III. of Bohn's edition), and remarks, "nothing resembling

a rose tree, either in flowers, branches, leaves, or growth . . . . if infused in water, will swell and display its parts."

That Jordan Almonds originally came from the Banks of the River Jordan

The short, broad almonds are called " Valencias," and the longer, narrower ones are almost universally known among English speaking peoples as " Jordan Almonds," a name which has certainly been in use since 1805 . . . . This name is from the middle English, " Jardyne almaunde," and means the " garden almond," *i.e.*, the cultivated almond, as opposed to the small fruit of the wild almond. The name is a corruption of the old French " gardin " (soft " g "), which became in modern French " jardin," through the Italian " giardino " ; it has therefore nothing to do with the Jordan, on whose banks almond trees do not flourish.

That a Poison and its Antidote always grow close together

The usual illustration given in support of the above statement is that stinging nettles and docks are always found near together. Another illustration is that rheumatism and willow trees both occur in damp places. The application of the " antidote " or remedy in this case, is not so simple or direct, as will be agreed when it is explained that one treatment of rheumatism is the administration of salicylate of soda, prepared from salicylic acid which is obtained from several varieties of willow, especially Black Willow (*Salix nigra*) ; Bedford or Leicester willow ; and Purple willow (*Salix purpurea*). Similarly, fevers and Cinchona frequently occur in the same neighbourhood, and from Cinchona bark quinine is obtained which is a drug employed in many cases of fever. These examples are somewhat far-fetched, and it may be pointed out that the remedies named are not the only ones for the respective " poisons." Thus probably an application of a " blue-bag " to the part of the person stung by a nettle would be as effective in the case of nettle-sting as it is in the case of a bee-sting, but blue-bags are not known to grow particularly well in the neighbourhood of nettles ! Again Salicylate of soda is not the only drug used in the treatment of rheumatism ; potassium carbonate is another. And quinine is not the only remedy for fevers.

Some of the most virulent poisons are of vegetable origin,

and to most of them there is, unfortunately, no antidote properly so-called, so that the antidote in such cases obviously cannot " grow near the poison." On the other hand, most of the inorganic poisons have true antidotes, such as chalk and soda to the mineral acids.

There are long articles on poisons and the treatment of cases of poisoning in Quain's *Dictionary of Medicine* and the *Harms. Ency.*, but not a word in support of the statement at the head of this article. It is, however, of considerable interest to note that several poisons are antidotes for other poisons ! *e.g.*, physostigmine is an antidote to atropine which in turn is an antidote to morphine ; while chloral hydrate is an antidote to strychnine. Similarly, opiates are antidotes to belladona, and potassium permanganate destroys morphine, while potassium ferro-cyanide is almost without action on the system !

That Shamrock Cannot be Grown in England

The editor of *The Weekly Tale Teller* once stated in his paper that he had failed to grow shamrock in England, but in the issue of June 14, 1913, he stated that he had received a big sheaf of correspondence that made it " abundantly clear there is no ground for the superstition that it will not grow in England, indeed one gentleman, Mr. Fred A. Allington, 23, Wellsby Street, Grimsby, sends me a bunch from his garden. . . . Another gentleman, this time from Glasgow, writes a postcard reeking with the brogue, and giving me directions for shamrock growing in a bowl of water."

Mr. Donald Gunn wrote :—" To answer this one would first want to know the botanical identification of your shamrock. Someone has truly said that botanists are as uncertain as to the identity of the co-called shamrock as they are of the species of thistle that forms the Scots emblem. Some of the plants called shamrock in Ireland are indigenous to that country, *e.g.*, wood-sorrel ; but others are of recent introduction—such as the white clover. The lesser yellow trefoil furnishes the bulk of the shamrock sold in the streets of Dublin on St. Patrick's day. The birdsfoot trefoil also does duty, as do the small clovers."

That Cape Gooseberries are Indigenous to South Africa

The botanical name for this plant is not misleading as is its vulgar name, for it is *Physalis Peruviana*, implying correctly

that it is a native of South America. The fruit is spherical, hairless, yellow and smooth, about ½ inch in diameter and contains many small seeds. While its flavour is not appreciated by all, it makes a nice jam which finds favour with a large number. The fruit is enclosed in a large loose leaf-like case which looks something like a Chinese lantern. This is really an enlarged calyx. There is another variety (*Physalis Alkekengi*) which has reddish fruit.

The calyx remains green until the fruit is ripe, then it turns yellow in the case of *P. Peruviana*, and reddish in the case of *P. Alkekengi*.

That Sponging the upper surfaces of leaves of plants kept indoors aids to their " breathing " (transpiration)

The " breathing pores," or stomata, of leaves occur almost exclusively on their *under* surfaces, so sponging the upper surfaces cannot affect the stomata. In the case of the floating leaves of water plants the stomata are on the upper surfaces for the good reason that the under surfaces in that case are not in contact with the atmosphere.

That the Sap of Trees goes up in Spring and down in Autumn

" Mr. W. G. Craib (Notes from the Royal Botanic Garden, Edinburgh, Vol. xi., Nov., 1918) has investigated the regional spread of moisture in deciduous-leaf trees during the felling season—that is, from late autumn until early spring. The species selected for examination was the sycamore (*Acer pseudoplatanus*), and the results, which are indicated by graphs and coloured diagrams of cross-sections, show that at the beginning of the season the centre of the tree is very wet, and at the end of the season there is a very wet region almost on the outside, while the centre is very dry. Between these two extremes are all the intermediate stages. The processes during the season are interpreted as follows : As the result of the water moving inwards from the outer zones, beginning at the base of the trunk, there is created an area of maximum moisture content, in any given cross-section, at the centre of the trunk. This inward current and the consequent plane of maximum moisture content at the centre gradually extend upwards in the trunk to the topmost region ; but before this is reached and the centre of the trunk at the top of the bole has become a region of maxi-

mum moisture content, a radial movement has begun at the bottom of the trunk. This radial movement also progresses upwards, and by its means the region of maximum moisture content passes almost to the outside of the trunk, leaving the centre the driest region. The movements upwards and radially, both inwards and outwards, are going on synchronously at different levels in the trunk. The expressions ' the sap is down ' in autumn and ' the sap is up ' in spring are, therefore, meaningless ; we should say rather ' the sap is in ' (the centre) or ' the sap is out ' (near the bark). These results in water-distribution are confirmed by experiments on other trees, and should do much to remove the prejudice against summer felling. The new facts brought to light also raise points of scientific interest as to the explanation of the activities in the tree during the so-called dormant period, or the reasons for the arrangement of the various pits in the tissue-elements." —p. 232, *Nature*, May 22, 1919.

That Mahogany is Wood obtained from one particular kind of Tree

" Prof. H. H. Dixon (Scientific Proceedings of the Royal Dublin Society, Vol. xv., p. 431) describes the microscopic characters of forty-five different kinds of timbers which have been classed under the name ' mahogany.' The name was originally applied to the timber derived from *Swietenia mahagoni* (Cuban, St. Domingo, and Spanish mahogany), a West Indian species, and from *S. macrophylla* (Honduras, Tabasco, and Colombian mahogany), a native of Central America, but it is doubtful if any of the timbers now on the market come from these sources, and certainly most of them do not. C. D. Mell has recently listed sixty-seven species of trees as supplying timbers the characteristics of which sufficiently coincide with the popular idea of mahogany to be marketed as that wood (U.S. Dept. of Agriculture, Bull. 474, Feb., 1917), and this list might be added to from our present knowledge. The mahoganies come from all parts of the tropics, and belong to very different families besides the Meliaceæ, to which Swietenia belongs. Prof. Dixon examines in detail the characters of these various timbers, and suggests a definition of mahogany to include all red or red-brown timbers in which the fibres of the adjacent layers cross each other obliquely, giving rise to a play of light and shade on

longitudinal surfaces, known as ' roe,' thus greatly emphasising and enhancing the figure. In addition, a mahogany should have scattered wood-vessels, isolated or in small, mostly radial, groups ; the parenchyma round the vessels should be narrow and inconspicuous, while the medullary rays are, on the average, well under 2 mm. in height, and not more than nine cells thick. In other respects the woods classed as mahoganies have very various properties ; for instance, with regard to density, hardness, presence or absence of year-rings, pore-rings, size and contents of vessels, distribution of parenchyma, etc. Prof. Dixon gives a detailed description of the microscopic characters, and also 138 photomicrographic reproductions with a uniform magnification of 31 diameters." —p. 411, *Nature*, Jan. 23, 1919.

That the Branches of the Banyan Tree send down Roots which start Fresh Trees around the Parent One

Mr. C. E. Clark, p. 44, *Mistakes We Make*, refutes this statement, while the *Harms. Ency.* gives the same explanation as he does.

The author saw and photographed one of these trees (*Ficus benghalensis*) in the Esbekieh Gardens in Cairo on July 8, 1913. The additions, stems or supports in the case of this tree showed no signs of forming trees, but what struck the author was that the supports or props to the branches were unnecessarily close in to the main trunk if the mechanical support of the branch was the chief purpose of the prop or aerial root. If mere support is their object one would expect them to occur more towards the middle of the length of the branch. Hence probably it is additional sap which is the chief object of these additional roots.

That Brazil Wood is Named after the Country

" *Brazil* wood is not named from the country, but *vice versa*. It was known as a dye-wood as early as the 12th century, and the name is found in many European languages. The Portuguese navigators found large quantities of it in South America and named the country accordingly. They christened an island *Madeira*, timber, Lat. *Materia*, for a similar reason."—Prof. Ernest Weekley, *Romance of Words* (1912), p. 47.

That Plane Trees grow well in London and other Towns because they Shed their Bark

The argument appears to be that in shedding their bark they expose a fresh surface, unclogged by soot, to the atmosphere, and are therefore able to "breathe" through their bark. The "breathing" of plants and trees takes place through their *stomata* and even if these do occur in the bark of trees (which is doubtful—the author has failed to find them in the bark of plane trees, or any reference to their being there in botanical works), the percentage that these bear to those in the leaves must be very small, therefore for the argument given above to be probably true, it would be necessary for the leaves to shed their epidermis.

In the works searched it is generally agreed that these trees do thrive in London, but no explanation of this fact is attempted.

On Aug. 6, 1919, a large plane tree in Kew Gardens bore a notice stating that there are more plane trees in London than of all other kinds put together, and that they thrive well there, but not a word about this being due to their shedding their bark.

That Woody Nightshade is Deadly Nightshade

Woody Nightshade is common; Deadly Nightshade fortunately is not.

The two plants do belong to the same natural order, *Solanaceæ*, but are very different in appearance though the colour of the flowers is somewhat alike. The flowers of the Woody Nightshade are small and purple with their five petals turned well back, thus exposing the yellow pyramid of anthers. The small fruit changes from green to yellow, orange and finally crimson. Another variety has white flowers and black fruit. The leaves are three-lobed.

The flowers of the Deadly Nightshade are lurid purple in colour and shaped something like a bell. The fruit is much larger than that of Woody Nightshade, and unfortunately has an attractive appearance and sweet taste, hence its danger to children, for if eaten, the results are likely to be serious. The colour of the fruit is deep purple to intense black.

That the Berries of Yew Trees are Poisonous

" Thy very beadsmen learn to bend their bows
Of double-fatal yew against thy state : "
King Richard II., III., ii., 116.

" The poisonous properties referred to by classical writers such as Cæsar, Virgil, and Livy, reside chiefly if not entirely in the foliage. This, if eaten by horses or cattle, especially when it has been cut and thrown in a heap so as to undergo a process of fermentation, is very injurious. . . .

" The succulent portion of the yew berry is quite harmless ; but it is probable that some noxious principle is contained in the seed."—*Ency. Brit.*, 11th ed., XXVII., 919.

Sir Thomas Browne in Book II., Chapt. VII. of his *Vulgar Errors* (1646), pointed out that the berries are harmless.

That to obtain the Best Results from Land it is necessary to have a series of different Crops on it

The practice above referred to is known as the Rotation of Crops, on which Mr. Donald Gunn wrote on Sept. 25, 1919, as follows :—

" All plants tend to impoverish the ground in which they grow, but they do this in different degrees and rob it of different constituents, and to varying depths. It is therefore obvious that land made sterile, or almost so, for one crop by the growth of that particular plant, still retains plenty of nourishment for plants of a different kind, during the growth of which the wastage caused by the first growth is largely repaired.

" Therefore a rotation, which has been practically arrived at in all lands by the experience of untold centuries, was the correct way to get the most out of the soil.

" More than that, some crops (legumes) are alone able, by the bacterial nodules on their roots, to fix the atmospheric nitrogen and make it available for the use of all. As the chemistry of agriculture improved it was found that manure, especially the artificial manures, were capable of giving directly and rapidly to the soil the very things the plants had removed. And now the farm bacteriologist has come in to help to prove that the old rotation of crops, though good, was not the only nor the best and quickest way of getting the most out of the land. That is why farmers are now urged to abandon it."

In a one column article in the *Daily Mail*, Dec. 16, 1916, Mr. Percy W. D. Izard wrote, " Farmers must sacrifice their prejudices and break into their traditions of crop rotation by an extensive sowing of wheat during the coming spring, taking for the purpose land which otherwise would have carried barley and oats."

That the Plant having a Dark Brown, long Cylindrical " Knob " at the end of a Long Stalk, and that Grows in Damp Places, is a Bull-rush

The plant above described is the great reed-mace (*Typha*).

The bull-rush (*Scirpus*) belongs to the natural order *Cyperaceæ*.

The " knob " of the great reed-mace consists of thousands of parachute-like seeds tightly packed, and if kept in a warm room they will burst from the knob in a beautiful manner.

That as a Rule Mulberry-trees do not Bear Fruit Until they are 14 Years Old

" The age at which these first bear fruit will depend in the main upon :—

(1) How they are raised.

(2) Where and how they are grown.

Seedlings are of slow growth in this country as their young wood ripens badly, and the usual method is to grow from layers or large cuttings.

When trained on a wall in the South of England—that is given the best chance possible in these islands—it may fruit in the third year. In Italy I imagine it would do so, however grown. In the North of England and Scotland mulberry trees grow but do not bear fruit at any age.

"It is all, mainly, a matter of the latitude—*i.e.*, of warmth. *See Trans. Hort. Soc.*, II., 1817, p. 92, Donald Gunn."

" Mulberry Trees.—Mr. Ackermann has asked the question as to what is the age at which mulberry trees begin to bear. I would refer him to *Our Common Fruits* (Frederick Warne and Co., 1866), which states :—

" ' The plant ordinarily becomes more prolific as it increases in age, while the fruit also improves in quality ; a good compensation for its bareness in youth, for (unless grafted) it does not usually bear at all until it has attained a rather

advanced age. Recent experiments, however, have shown that it is possible to make a mulberry tree fruit when only three years old.—H. Prosser Chanter, Whetstone, Middlesex.'" —*Notes and Queries*, Aug. 26, 1922, p. 179.

That the Yellow Sap-Pigments are Responsible for the Yellow Tints in Flowers and Berries

"It is often erroneously stated that the yellow sap-pigments are responsible for the yellow tints in flowers and berries, but in reality the bright yellows are almost exclusively due to plastid colours related to carotin, whilst the orange and brown tints are produced by combinations of these colours with those produced by pigments of the anthocyan group. In some few instances, however, it is probable that sap-pigments give rise to fairly strong yellows, but, in general, members of this class of compound produce pale yellow tints such as the colour of the primrose, or are present in an almost colourless condition in the acid cell-sap of white- or cream-coloured flowers. It is exceedingly difficult, even for one who has studied the pigments minutely, to be certain by mere observation which of the anthocyan pigments is present in any flower that may be examined. Chemical work has shown that plants of the same botanical group may produce different pigments, and, indeed, that more than one anthocyan, or yellow sap-pigment, may be present in the same flower."—*Nature*, April 1, 1920, p. 140.

MINERAL KINGDOM

That German Silver contains Silver

It is the "white copper" of China, introduced into Europe by the nation noted for its bands, and does not contain any silver, the following being its usual composition :—

Copper	4	parts by weight.
Nickel	2	
Zinc	1	

These proportions are varied by different makers, and sometimes a small quantity of lead, and even iron, is added.

It has been suggested that the word is *german = akin to*, as in "cousin-german," but this is wrong, for in that case German silver would be written with a small *g*, which it is not. It is called German silver because first made in Europe at Hildberghausen in Germany.

That Mosaic Gold contains Gold

Mosaic gold is merely a compound of tin and sulphur, known to chemists as stannic sulphide and may be made by heating a mixture of finely divided tin, sulphur, and sal-ammoniac.

That Chloroform is Inflammable like Ether, Benzine, and Spirits of Turpentine

The above four fluids are similar in appearance, all being colourless (like water), and very mobile ; and besides being volatile, each has a strong characteristic odour. Lastly, the latter three *are* highly inflammable, and hence, no doubt, the idea that chloroform is also. If a piece of paper be saturated with chloroform, it can be made to burn, but it burns better without it ; and where there is a little pool of the liquid, this *evaporates* before the paper burns from under it.

That when you cool a Red-hot Iron (or other metal) Rod in Water, the heat rushes up towards your hand

If you take a poker that has been made red-hot at one end, and plunge this into a bucketful of water, the water

in the immediate neighbourhood of the poker is converted into vapour. This warm vapour rises, impinges on the hand holding the poker, and creates the impression that the heat of the red-hot end has rushed up the poker to the hand, whereas in fact the heat is passing down from the warm portion just above the water, to the now cool portion *in* the water.

That Carbonic Acid Gas (carbon dioxide, CO_2) is Very Harmful to Human Beings

If we take a deep inhalation, it is easy to hold our breath for over a minute (an expert swimmer has remained under water for over three minutes!), and if we first exhale as much air as we can, and then stop breathing, we can do so for half a minute or more. Hence, if carbon dioxide merely did not support life (like nitrogen) we should be able to breathe it for half a minute, that is the time for which we can do without air. This, we believe, is impossible; for if we put our nose within an inch of the surface of the yeast in a fermenting vat in full action, and then take a sniff, we think half a *second* will satisfy the curiosity—albeit scientific!—of most people. It did ours, and our curiosity is as that of a woman!

Prof. Huxley, F.R.S., says:—"But in this asphyxiating process, two deadly influences of a distinct nature are co-operating; one is the *deprivation of oxygen*, the other is the *excessive accumulation of carbonic acid* in the blood. Oxygen starvation and carbonic acid *poisoning*, each of which may be fatal in itself, are at work together."

Prof. Thorpe, F.R.S., says:—"Carbon dioxide is irrespirable; animals soon die when immersed in it, not only from the want of oxygen, but also from the direct *poisonous action* of the gas. Even in small quantity, it produces great languor and depression; and in larger quantities, it occasions complete atony of the brain functions."

G. S. Newth, F.I.C., F.C.S., says:—"Although carbon dioxide is not such a poisonous compound as the monoxide, it nevertheless does exert a direct poisonous effect upon the system, and death caused by this gas is not merely due to the absence of oxygen."

Sir Ray Lankester, F.R.S. (writing in the *Daily Telegraph*, Feb. 12 and 19, 1912), does not agree that CO_2 is poisonous, maintaining that when atmospheric air has been "used up"

by combustion or respiration so that 5 per cent. of CO_2 is present *in place of* an equivalent volume of oxygen, the remaining 16 per cent. of oxygen is insufficient to support human life. This probably is so, but supposing 10 per cent. of CO_2 were added to normal air, then the percentage of oxygen would be 19·1, but for all this the mixture would probably not support human life.

In the author's college days it was held that 20 parts of CO_2 per 10,000 (= 0·2 per cent.) was the utmost limit of pollution of air by CO_2 that could be allowed, and this view still largely persists, and is no doubt correct if the gas be produced by the lungs of animals, not that such CO_2 *per se* is different from CO_2 produced by chemical means, but because of the organic matter, moisture and heat by which it is accompanied. It is the moisture, heat, and stagnation of the air in a crowded room or hall which are now recognised as the real offenders, and CO_2 has nearly cleared its character. Most exhaustive experiments have been made on the subject by Prof. Leonard Hill, F.R.S., Dr. J. S. Haldane, F.R.S., Prof. Vivian B. Lewis, F.I.C., and Dr. Samuel Rideal, D.Sc. The title of the chief report by the latter is *Relative Hygienic Values of Gas and Electric Lighting*. It occupies 132 pp. of Vol. XXIX. (1908) of the *Jour. Roy. San. Inst.* In the summary Dr. Rideal states, " Carbonic acid has not the injurious effect which was formerly attributed to it."

The following paragrph under " Science Notes," appeared in *The University Correspondent*, May 15, 1912 :—

" Recent experiments have shown that the ill-effects of insufficient ventilation are due mainly to diminished evaporation from the skin, consequent on stagnation of the air ; that although it is not legally permissible for the carbon dioxide in factory air to exceed a few parts per thousand, no harm whatever is caused by breathing air containing up to 4 per cent. of this gas ; and that the use of ozone in ventilation depends largely on its power of removing the unpleasant odour emitted from an imperfectly washed crowd of people.

" The established facts upon which these conclusions are based are in some cases quite against previously held views. For instance, at least one-third of the air given out at each breath is re-breathed, hence it is quite impossible that a few parts per thousand of carbon dioxide in the outside air should affect the lungs, in which the percentage is normally about 5 per cent."

In moving into his present house, the author was concerned about the difficulty of fitting the gas cooker in the kitchen with a chimney which would take the products of combustion into the flue of the kitchen range, and in the end decided to try the effect of having no chimney. The result has been entirely satisfactory as regards any ill effects on health, but any article in the kitchen made of iron (and some other metals) rusts badly. Obviously, with two doors and a large window, besides the chimney of the range, the amount of CO_2 could never get up to 5 per cent. (which would have effect), for the doors are frequently being opened and shut and in any case are far from air tight. Later gas-stoves were fixed in the dining room and two of the bedrooms, and with the experience of the kitchen gas-cooker, and knowledge gained from the researches mentioned above, it was decided not merely not to have chimneys to them, but to close the chimneys of the fire-grates (in front of which the gas stoves stand) by means of the registers ! Canaries are kept in the dining room and they were carefully watched to see if they suffered any ill effect due to the change, but none was observed and they sing as merrily as ever. If anything went wrong with the stoves, so that they produced carbon *mon*oxide, then there would be some danger, but a little attention prevents this. The bedroom windows, too, are usually open day and night. The object of closing the registers is to prevent waste of heat.

In answer to a question on the subject, Prof. Leonard Hill, F.R.S., wrote on Nov. 8, 1912 :—" I don't know the paper you refer to, but I can put you on to abundant physiological literature which proves that varying percentages of CO_2 such as occur in badly ventilated rooms have no effect at all on human beings. There are no curves and no evidences of any such effect."

Prof. Lewis gave a large amount of information on the subject in his lecture in the theatre of the Midland Hotel, Manchester, on Oct. 8, 1912, from which the following quotation is taken :—

" Dr. Haldane and Dr. Leonard Hill have also demonstrated that the carbon dioxide even when present in such enormously increased quantities as 3 to 4 per cent., has no effect except to deepen the breathing, while with 6 per cent. it begins to produce headaches, palpitations, sweating, and distress, and with 11 to 12 per cent. coma sets in, but does

not quickly destroy life. . . . health is dependent upon temperature, moisture, and movement of air; the latter being one of the most important factors."

Dr. F. S. Toogood, medical superintendent of Lewisham Infirmary, has made a number of experiments and reported on the matter in the *Medical Magazine* for Feb., 1911. One of his conclusions was, "That in large rooms, adequately ventilated, flueless gas-stoves can be used for heating without any hygienic disadvantages, the heated products of combustion (mainly CO_2 and water vapour) ascending quickly above breathing level."

"He, of course, did not speak of factories in which poisonous fumes were given off, but ordinary factories and dwelling houses, and places of public resort, in which the contamination was due to the presence of human beings. In such conditons any increase in the percentage of CO_2 or reduction of the percentage of oxygen was never such as to have any physiological influence upon us, even when the rooms were crowded. There was no proof that anything of a poisonous chemical nature was exhaled in the human breath, as was stated to be the case in popular books on hygiene. One thing which really mattered in crowded rooms was the infection of one person from another by bacteria. . . ."—Prof. Leonard Hill, M.D., F.R.S., discussing Mr. A. H. Barker's paper on *Developments in Heating and Ventilating* before the Society of Engineers, May 11, 1915.

"Dr. Leonard Hill had referred to the dispersion of the old 'CO_2 bogy,' and Mr. Barker said he had found air in a room feeling perfectly fresh with 25 parts of CO_2 per 10,000 present in it. But soda-water workers often worked in an atmosphere containing 300 parts of CO_2 per 10,000 [= 3 per cent. !], and apparently without any physiological disability."—F. W. Goodenough, *ibid.*

The foregoing are in respect to its action on the lungs. It does not appear to act as a poison in the alimentary canal, for aerated waters and fermented liquors contain considerable quantities of it.

That a Diamond never wears out

"It is altogether an error to suppose that diamonds will not wear out. In the shops of wholesale glaziers, where the diamond is in constant use, one is worn down in a

month or six weeks, so as to require resetting ; after which, with the same wear, it usually lasts another month, and then becomes useless. It may, however, be presumed that such diamonds travel over some miles of glass before they are worn out."—John Timbs, F.S.A.

That Gold is the most valuable metal

Standard gold, of which the gold coins of the realm are made, is 22 carat, *i.e.*, 22 parts by weight are pure gold and two parts are an alloy of silver and copper. Thus an ounce troy of standard gold contains 440 grains of pure gold and 40 grains of alloy. A sovereign weighs 123·274 grains, and therefore $\frac{480}{123 \cdot 274} = 3 \cdot 894$ sovereigns are coined from one ounce of standard gold. The constant pre-war value of standard gold, therefore, was £3·894 = £3 17s. 10½d. per ounce troy. The weight of pure gold in a sovereign is $\frac{22}{24}$ of 123·274 grains = 113 grains ; therefore the value of pure gold was $\frac{480}{113} = 4 \cdot 248$ = £4 4s. 11½d. per ounce troy. This neglects, as is usual, the value of the small quantity of alloy.

That gold is far from being the most valuable metal is shown by the following table of present values of some of the precious metals.

Metal.	Cost per oz. troy.
Gold	£4 10 6
Cerium	5 18 0
Caesium	17 0 3
Palladium	19 10 0
Osmium	20 0 0
Didymium	23 4 0
Platinum...	25 0 0
Rubidium	30 5 0
Thorium	44 0 0

For the foregoing prices, which are those current in Aug., 1923, I am indebted to Messrs. Baird and Tatlock, the well-known manufacturing chemists.

Speaking at University College, London, in Oct., 1910, Sir William Ramsay, F.R.S., said the cost of radium was £420,000 per ounce !

That Sapphires are always Blue

It is true that the name sapphire is usually restricted to the blue variety, but red, green, white, violet, and yellow sapphires also are found. They are all slight variations of the mineral corundum which is next to the diamond in the scale of hardness.

That Titanium is a rare metal

It is said to be rare by G. S. Newth, F.I.C., F.C.S., in his *Textbook of Inorganic Chemistry* (2nd ed., 1895), p. 581, but the following extract from the *United States Geological Survey Press Bulletin*, No. 301, for October, 1907, refutes this:—

"Titanium, although generally spoken of as one of the rare elements, is really one of the more common ones. According to Dr. F. W. Clarke, Chemist of the United States Geological Survey, it forms 0.43 per cent. of the surface rocks of the globe, and is much more plentiful than lead, zinc, copper, and other metals classed as 'common.' A great many schists and gneisses carry titanium, and it is found in appreciable quantities in clays—not only surface clays, but also those that have been dredged from the sea bottom.

"Many iron ores contain titanium, and ores containing 1 per cent. or more have generally been avoided by miners, owing to difficulties experienced in smelting, due to thick, pasty slags; but it is claimed that when properly handled titaniferous ores give no more trouble with slags than other iron ores. It is said that steel and iron made from iron ore smelted in a blast furnace running on the titaniferous ores of the Adirondacks took a prize at the London Exhibition of 1851. The addition of titanium to cast iron greatly increases its strength, and an alloy called ferro-titanium is now manufactured at a number of places in this country and Europe for use as an agent by which to introduce the titanium into the iron. It is believed that titanium is used by various firms to increase the tensile strength and elastic limit of steel, and although much secrecy is maintained concerning the matter, it seems probable that some steels that are imported as vanadium steels are in reality titanium steels. As titanium, unlike other metals used for the same purpose, such an vanadium, molybdenum, and tungsten, is plentiful and cheap, its successful use in steel hardening should establish a large market for it.

" The statistics of production of a group of rare metals, including titanium, are given in an advance chapter from 'Mineral Resources of the United States, Calendar Year 1906,' by Frank L. Hess, geologist of the United States Geological Survey."

That Sulphur is soluble in water

Prof. Vivian Lewes put this fallacy humorously when lecturing many years ago: " Now we come to sulphur, with which you are all familiar in the form of a brittle, yellow solid, usually sold in pieces shaped like short, thick rulers. It is the stuff you put into your dog's water when he is ill. *Why* you put it there I don't know, because it is perfectly insoluble in water; but a dog is an intelligent animal; he sees you are trying to do your best for him, and so possibly feels better."

Sir Henry Roscoe, F.R.S., Sir Edward Thorpe, F.R.S., and G. S. Newth, F.I.C., F.C.S., all agree that sulphur is insoluble in water.

That Sulphur is usually and necessarily given off by Volcanoes

" There is very generally current a mistaken notion as to the essential connection of sulphur with volcanoes. It is true that sulphur is readily volatilised by heat, and deposited in fine crystals when cooling sets in. Hence, it is not surprising that, in connection with the deposits resulting from the outbursts of volcanoes sulphur should be found. But it seems that the separation of sulphur from its chemical combinations as sulphides and sulphates is not the work of the molten furnaces of volcanoes. Really the existence of sulphur in the considerable quantities in which it is found in natural conditions, as a pure crystalline uncombined element, is the work, not of volcanic heat, but of minute microscopic plants—the marsh-gas-bacteria and the sulphur-bacteria! This is a surprising, and to many persons a disconcerting, conclusion; but it is one based on facts . . . . Now, although there is at the East end of Sicily the very magnificent volcano known as Etna, the sulphur mines are not anywhere near it, and have nothing to do with it!

" There is little, if any, sulphur on Etna, and similarly, although there are sulphurous springs and gases near Vesuvius and in the Solfatara, there is practically no sulphur there . . . . This yellow deposit [in the crater of Vesuvius]

is always called ' sulphur ' by the guides, and is accepted as such by the visitor, who thinks it only natural that there should be sulphur where he is often half choked by acrid fumes. But in reality the fumes are hydrochloric acid (HCl), and are rarely sulphurous acid (H_2SO_3), whilst the deposit consists of ammonium chloride and other alkaline chlorides coloured yellow and orange by iron chloride! . . . . The existence of pure sulphur is not due to the tremendous fires of a huge volcano, but to the quiet, unobtrusive work of microscopic plants (bacteria) multiplying for hundreds of years as a slimy living layer on the bottom of a ' dead sea.' "—Sir Ray Lankester, K.C.B., F.R.S.

That there are Mines from which Metallic Brass may be Obtained

This error has probably arisen from the biblical reference to native brass, for we read in *Deuteronomy* VIII., 9, " . . . . and out of whose hills thou mayest dig brass." Also, *Zechariah* VI., 1., " . . . . . and the mountains were mountains of brass."

Brass does not occur in nature. It is an alloy of one part of zinc with two parts of copper. Other alloys of other proportions of zinc and copper are given other names, thus :—

		Copper		Zinc
Dutch brass (*Tombac*)...	=	5	+	1
Pinchbeck	=	3	+	1
Muntz metal	=	3	+	2

The proportions are not rigid, and sometimes small quantities of other metals are present, *e.g.*, Muntz metal may have a little lead and iron in it as impurities.

Copper is found in the metallic state (native copper) especially in the neighbourhood of Lake Superior, but it is in such solid masses, that it is difficult to work.

In a note on *Deut.* VIII., 9, we are told, " For ' brass ' read ' copper.' "

Zinc, also, is not found in the metallic state.

That the Cleavage of Slate is usually Parallel to its Bedding Plane

In Prof. David Page's *Introductvry Text-book of Geology* (11th ed.), p. 81, we read, " . . . . and this splitting takes place, not always parallel to the lines of stratification, as in

flagstones used for pavement, but in a direction right through the beds, and often almost at right angles to them."

While in *Harms. Ency.* under 'slates' we find, "The cleavage is quite distinct from the bedding, which is known as the 'stripe.'" And under 'cleavage,' "A Slate can be split into thin slabs, which, as a rule, are not parallel to the bedding-planes, but inclined to them at high angles."

Tyndall and others have shown that the property of cleavage can be produced artificially in such substances as beeswax by subjecting it to pressure acting uniformly in a certain direction.

A. B. Searle, p. 51, *Natural History of Clay* (1912), says, "*Slates* are distinguished from shales by their splitting into thin leaves which are not in the plane of original deposition, but are due to the deposited material being subjected to great lateral pressure. The rearrangement of the particles thus produced has imparted to the material a cleavage quite independent of the original lamination."

That Gold Always Looks Yellow

It looks yellow when light is reflected once from some bright solid piece of the metal, but if a large piece of gold foil be twisted into a hollow, deep cone, causing the light to be many times reflected from its surface before it reaches the eye, then the colour is red, while very thin gold leaf gives a green, colour by transmitted light. When in a fine powder it is dark red, or black.

That Water cannot be found in Primary Rocks

"All rocks contain water."—*Chamb. Ency.*, IX., p. 661.

Mr. Philip Parker, B.A., B.C.E., M.Inst.C.E., the author of *The Training of Water*, said on Nov. 30, 1915 :—

"The general geological principles about the cause of water in rocks are as follows. Water occurs in loose grained rocks, such as sand stones, sand gravels, and also in lime stones. In these it occurs in the fissures. Now, Primary rocks are old, and have usually been exposed to great pressure at some period of their existence, thus, loose grained rocks do not usually occur. Similarly lime stone is not at all common in Primary rocks, the reason being, either that the life of the Primary ages was not of such a character as to deposit lime stones, or, what is more probable, that lime stones being

soluble in water, any lime stone that had existed in a Primary rock has been leached away. Thus it will be plain that it is unlikely that any notable water bearing stratum should exist in Primary rocks. On the other hand, for this very reason no Primary rock that does receive water is likely to retain it for the simple reason that there is no stratum near it which will give the water a free passage. Also, Primary rocks are usually fissured. Thus, while you very rarely find much water in a Primary rock, it is also very rare that a bore in a Primary rock does not produce some water. The most notable instances are lighthouses on Primary rocks which are usually supplied with water sufficient for their purposes by a simple bore, say 4 in. diameter by 200 ft. deep.

" Thus the way to state the proposition would be :—

" It is fairly easy to get a little water out of any Primary rock, but it is extremely rare to secure a large supply such as would be needed for a town."

That a Gravel Soil is More Healthy to Live on than a Clay one

" For warmth, for dryness, for absence of fogs, and for facility of walking after rain, just when the air is purest and at its best, there is nothing like gravel ; but when gravel has been rendered foul by infiltration with organic matters, it may easily become a very hot-bed of disease."—*Ency. Brit.*, 11th ed., " Soil."

The following matter appears at p. 17 of *Notes and Queries* of July 1, 1916 :—

" With regard to Mr. Ackermann's query No. 2, the supposed superiority of gravel to clay, I wish to assure him that, so far as London is concerned, facts will prove this to be a fancy. If he will examine the Registrar-General's Returns and the geological map of London, he will find that the highest and the healthiest parts of London are on the ridges, northern and southern, of the clay basin of the Thames, such as Highgate, Hampstead, and Harrow on the north, and Richmond Hill, Sydenham Hill, and Forest Hill on the south. Gravel is always the soil found next or near the water course. I went very fully into this question in a paper which I had the honour of reading before the British Balneological and Climatological Society, entitled ' The Clay and Gravel Soils of London and the Relative Advantages of dwelling upon Them,' published in the

Society's *Journal* for January, 1902.—S. D. Clippingdale, M.D."

"2. Gravel *v.* clay.—Before population became so thick, gravel was estimated a more healthy soil to live on than clay, because gravel assisted drainage. You dug a hole, and the loose nature of the soil did the rest for the drainage, whereas clay did not so help, and care had to be taken to lead the drainage away or to empty out cesspits or pools in a clay soil frequently. But now population is more dense, on a gravelly soil, unless care be taken, you may get your neighbour's drainage.

"Another reason in favour of gravel is that it is not so cold to live on as clay."—"Hic et Ubique."

Dr. C. V. Drysdale, D.Sc., informed the author some years ago that the vital statistics of Hampstead Garden Suburb are particularly satisfactory, especially as regards children. The suburb is on clay.

That all Gold Mines are very Profitable

Who has not heard the expression, "It is a gold mine," implying that the business in question is a highly profitable one.

Lt.-Col. H. L. Templer, M.I.Mech.E., the late chief engineer of Ferriera Deep, Ltd., the company working the celebrated Ferriera Deep Gold Mine in South Africa, told the author in November, 1918, that 15 South African gold mines were working before the European War at a margin of less than two shillings profit per ton of ore crushed. Out of this profit dividends and taxes had to be paid. Consequently a small increase in the cost of working makes it no longer commercially possible to work such mines.

That a Diamond is the Hardest Substance

Sir Ray Lankester, K.C.B., F.R.S., at p. 27 of his *From an Easy Chair* (1909), says:—

"Diamonds are readily distinguished from paste by the Röntgen rays, since they are transparent to those rays, whilst paste (or glass) is opaque to them. Radium also causes diamonds, but not paste, to phosphoresce. All diamonds are not equally hard, though they are the hardest of stones, and harder than steel, but not harder than the metal tantalum."

ASTRONOMY

That a Solid Body—"a Thunderbolt," Comes Down and Buries itself in the Earth when there is a Lightning-flash

"This is no fish, but an islander, that hath lately suffered by a thunderbolt."—The Tempest, II., ii., 35.

"How dare you ghosts
Accuse the thunderer, whose bolt you know,
Sky-planted, batters all rebelling coasts?"
Cymbeline, V., iv., 94.

"The term thunderbolt, which is nowadays rarely used except by poets (and by penny-a-liners), preserves the old notion that something solid and intensely hot passed along the track of a lightning flash and buried itself in the ground. Two distinct classes of phenomena probably gave rise to this notion. When lightning strikes the ground it bores a hole of considerable depth, which is found to be lined with vitrified sand. This presents no difficulty. But aerolites (meteorites) are often found, in the holes which they have made, still intensely hot, in consequence of their rapid passage through the air.

"A hasty generalisation seems to have connected these two entirely independent phenomena, and thus gave rise to the notion of thunderbolts."—Prof P. G. Tait, M.A., D.Sc., F.R.S., in the *Ency. Brit.*

"In gravel pits are found flinty stones, which are generally known by the name of thunderbolts, and are believed by many to come from the clouds; they are, however, petrified casts of the interior of the shells of several species of *Echinus* (sea-egg, sea-hedgehog, or sea-urchin), the petrifying matter having occupied the place of the animal, while the chalky shell has perished by the action of air, or by violence. When the animal is living, the outer part of its covering is furnished with numerous spines, which enable the creature to roll itself along at the bottom of the water; from this arises its name of the sea-hedgehog."—J. Timbs, *Popular Errors.*

On making inquiries about thunderbolts, a fair graduate of Oxford said her father had seen one: "It came down the chimney, ran all about the floor, tore up the tiles, and he had to open the door to let it out!" About the same time

(Oct., 1917) another said: "You should have the windows open in a storm so as to let the thunderbolts out."

A meteorite is sometimes called a thunderbolt, but even this fact does not account for it being necessary to open the front door for one!

Belemnites are also called thunderbolts, but a belemnite is a fossilised animal belonging to *Cephalopoda*, and is described in detail by Huxley at pp. 14—17 of his *Science and Hebrew Tradition* (1893).

That Lightning Describes a Zigzag Path with Acute Angles*

This error should not need much refuting now that there are so many excellent photographs of lightning. The appearance of lightning closely resembles a river and its tributaries, as represented on an ordinary atlas.

The artists P. Nasmyth and J. M. W. Turner used to represent lightning correctly, though they had not the assistance of the fine photographs that modern artists have, and yet, strange to say, these latter-day saints do *not* make the use of them they might do; and the author knows one case where a London professor of art has painted a fine large oil painting, in which there occurs a finely developed "zigzag," and which looks for all the world as if it had been copied from that which used to be seen at Maskelyne's, he, apparently, having bought his at so much a yard!

There is at least one electrical paper in London which always makes a stand for precise language and scientific accuracy. Its former title was *Lightning*, and the seal or stamp on the flaps of the editorial envelopes had two streaks of lightning, each with a very bad attack of the acute zigzag complaint.

Sir John F. W. Herschel, M.A. (*Discourse on the Study of Natural Philosophy*, p. 120), chose a rather unfortunate illustration of "an exact notice of the thing observed," for he goes on to say, "Thus, if lightning were to strike the house we inhabit, we ought to notice what kind of light we saw—whether a sheet of flame, a darting spark, or a broken zigzag. . . ."

The foregoing quotation from Sir John Herschel, and

* There is a good article on lightning in the *Strand Magazine* for January, 1897, and one on lightning conductors in the *World's Work* for July, 1906.

the following ones from the *Popular Physics* of Dr. Dionysius Lardner, show the state of scientific knowledge on this point at certain dates. Lardner was born in 1793 and died in 1859, and the edition we are quoting from was published about 1894. At p. 181 of his chapter on "Thunder and Lightning" we read, "The form of the flash in the case of lightning, like that of the spark taken from an electrified conductor, is zigzag. The doublings or acute angles formed at the successive points when the flash changes its direction vary in number and proximity. The cause of this zigzag course, whether of the electric spark or of lighting, has not been explained in any clear or satisfactory manner." [It would have been very awkward if it had been explained!] To convict himself up to the hilt, Lardner gives at p. 182 a lettered diagram of a finely developed zigzag!

Globular lightning, on the other hand, though very rare, is an established fact. For an account of one instance, see *Nature* of June, 1919, p. 284.

That Shooting or Falling Stars are Actual Stars, as their Name implies

> *"I see thy glory, like a shooting star,*
> *Fall to the base earth from the firmament."*
> King Richard II., II., iv., 19.
>
> *"And little stars shot from their fixed places."*
> The Rape of Lucrece, line 1,525.

This fallacy has arisen from the not uncommon practice of relying on one's own judgment concerning matters of which we know nothing, or next to nothing. Certainly as far as *appearances* go, a star does seem suddenly to take it into its head to rush off at a mad pace, and to the eye the distances from the earth of the real stars and the "falling star," appear to be the same, whereas in reality the actual stars are many millions of times farther off than the "falling star." But then a drunken man says he is sober, and a madman that he is king, these being merely degrees of misjudgment due to physical imperfections (temporary or permanent)—"We are none of us perfect, no, not one."

An evening spent at Maskelyne's ought to convince the most confident how easy it is to deceive the senses, especially if they are dealt with singly.

Well, to come to our subject, "shooting stars," or meteors, are caused by masses of solid matter, which may

once have formed part of some planet, moving at a velocity of about 30 miles per second at a distance of 40 to 80 miles from the surface of the earth. At a distance of 80 miles from the earth's surface the atmosphere is very attenuated, but the friction of it is sufficient—owing to the enormous velocity of the body—to cause the matter to become incandescent and to burn, hence when a portion of the body (called a meteorite) does reach the earth it is only a fraction of the mass that first entered our atmosphere, the rest having been oxidised and volatilised by the extremely high temperature.

Thus a meteor, or so-called "falling star," is the phenomenon of a meteorite (aerolite) moving at such a speed through the atmosphere as to cause it to incandesce.

"The term meteor is more particularly applied to the largest phenomena of this description, those next in size are called 'fire balls,' and the smallest, 'shooting stars,' though this last is a misleading term. The comets are well-nigh a millionfold, and even the moon is a thousandfold more distant from us than these meteors."—H. A. Nicholson, M.A., D.Sc., in *Ency. Brit.*

That the angle subtended by the Sun or Moon when they are rising or setting is greater than when they are at their zeniths.

For a full account of this fallacy we refer our readers to p. 82 to 84, inclusive, of *Popular Physics*, by Dr. Lardner.

Briefly the explanation of why these orbs *appear* to be larger when rising or setting is as follows:—We estimate the size of an object by mentally combining the angle which it subtends at our eye with what we judge to be the distance of the object from us. Now when the Sun or Moon is in the zenith, nothing intervenes between them and us, and we do not think they are far off; but when they are rising or setting, then many miles of trees, houses, fields, mountains and roads intervene, and we may know intimately a large portion of these intervening objects which appear to stretch away to the end of the earth, and the orb appears quite correctly to be even beyond these.

Hence in this case we are greatly impressed with the distance the Sun or Moon is off, and mentally combining this distance with the same angle subtended at the eye,

we arrive at the natural conclusion that the object is much larger.

As a fact the angle at the eye subtended by the full Moon when rising is nearly 1·7 per cent. *less* when she is rising than when she is at her zenith, because when rising she is about 4,000 miles further from us than when she is at her zenith. This is because the radius of the Earth is 4,000 miles. A diagram will make the matter clear.

Owing to the refraction due to the atmosphere, the vertical diameter of the Moon when rising *appears* to be less than the horizontal diameter, but the latter is not distorted and subtends the angle it should do by reason of the diameter of the Moon and the distance (240,000 miles) she is from the centre of the Earth. A pretty full account of this illusion is given at p. 770 of Vol. II. of *Ency. Brit.*

It is a good question to ask someone what, held up at arm's length, *appears* to be as large as the Moon, that is, what subtends the same angle at the eye. Some will say a cheese, others a dinner plate, and so forth. In reality a sixpenny-piece easily covers either orb.

That a lunar month is equal to twenty-eight days

Whitaker's Almanac for 1909, p. 431, under "Measures of Time," has "28 days = 1 lunar month."

In law a lunar month is *assumed* to be 28 days, and there are consequently 13 such lunar months in a year, but the mean value of a lunar month is slightly more than 29½ (29·530599) days, and any particular lunar month seldom varies more than six hours from this mean. The variation is due to the fact that the orbits of the earth and moon are not circles.

Blackie's Modern Ency., under "Month," says, ". . . The *anomalistic month* is a revolution of the moon from perigee to perigee, average 27 days 13 hrs. 18 mins. 37·4 secs.; the *sidereal month*, the interval between two successive conjunctions of the moon with the same fixed star, average 27 days 7 hrs. 43 mins. 11·5 secs.; the *synodical*, or *proper lunar month*, the time that elapses between new moon and new moon, average 29 days 12 hrs. 44 mins. 2.9 secs."

The approximate value of a lunar month is easily checked by a diary, *e.g.*, there was a new moon on Sept. 14, 1909, and the next after that was on Oct. 14, while the next to

that was on Nov. 13, the lunar month in each case being nearly 30 days.

That the Earth is nearest to the Sun about the 21st June, and farthest from it about 21st December

The above recorded mistake probably occurs only in the Northern latitudes. It would be interesting to know whether in Southern latitudes (New Zealand, *e.g.*) the corresponding idea is held, *i.e.*, whether it is thought there that the earth is nearest the Sun in Dec. It is a very natural mistake. When you go nearer to a fire you feel its heat more, hence, as it is warmer in the Northern latitudes in Summer than in Winter, it is thought the Earth must be nearer to the Sun then. Almost exactly the reverse is true, for the Earth is farthest (94½ millions of miles) from the Sun on July 1, and nearest to it on Dec. 31 when the distance is 91 millions of miles.

The seasons, Spring, Summer, Autumn and Winter, are due to an entirely different cause, namely the fact that the axis of the Earth is inclined to the plane of the Earth's orbit round the Sun, thus causing the Sun's rays to strike the Northern latitudes at a much greater slant in Winter than in Summer. This has a double effect: (1) fewer rays fall on a horizontal square yard, and (2) the rays have to pass through a greater thickness of atmosphere, both conducing to a lower temperature.

That the Harvest Moon always occurs at the time of Harvest let that happen when it may

The Rev. T. F. Thiselton Dyer, M.A., p. 45, *English Folk-lore*, "There is a very prevalent opinion among the lower and uneducated classes that the harvest Moon always occurs at the time of harvest, let that happen when it may. It is needless, however, to remark that such an erroneous idea can only proceed from persons of an entirely ignorant turn of mind—it being childish to suppose that the change of the Moon could in any way be influenced by such an occurence." Olmsted, p. 169, *Mechanism of the Heavens*, explains the reason thus:—"About the time of the autumnal equinox, the Moon, when near her full, rises about sunset a number of nights in succession. This occasions a remarkable number of brilliant moonlight evenings, and as this

in England is the period of harvest, the phenomenon is called the harvest Moon."

Harms. Ency. defines the harvest Moon as "the full Moon nearest to the Autumnal Equinox."

That the Sun is a Ball of Burning Fire

"As certain as I know the sun is fire."—Coriolanus V., iv., 45.

For a simple, brief, and up-to-date account of the Sun readers are referred to *The Sun*, by R. A. Sampson, D.Sc., F.R.S. From this it will be seen that we are by no means absolutely sure how the Sun is constituted, nor how this supply of heat is kept up, but the ball-of-burning-fire theory is shown to be at fault in the following quotation (p. 28) :—

"It is perhaps hardly necessary to say that maintenance by combustion is out of the question. The heat of combustion is energy set free in the rearrangement of molecules of two substances when they form a compound of lower intrinsic energy than the sum of their separate energies. It cannot be said that there are no chemical compounds upon the Sun, since titanium oxide and manganese hydride and cyanogen have been detected; but the temperature of the Sun is too high to allow of the formation of nearly all compounds that we know, and there is certainly no evidence that this has been a substantial source in the past."

That there is no doubt the Sun is gradually getting Cooler

"The process of radiation must have an eventual consequence in the gradual contraction of the whole body of the Sun. Considering only the atmosphere of the Sun, we have seen how loss of heat by the outer parts will result in a contraction of that part, and each part in turn is exposed to this. Thus the atmosphere is continually contracting upon the nucleus, and drawing out from the nucleus portions charged with heat upon a higher scale from their own, which in turn go through the same process. Thus contraction must of necessity be continually proceeding. And this contraction, paradoxical as the statement may sound, may, and for a period does, raise the temperature of the whole above the level at which it stood before. . . . Hence it seems still far from the limit of its contraction, and is therefore probably still growing hotter."—R. A. Sampson, D.Sc., F.R.S., Astronomer Royal for Scotland, p. 25, *The Sun*.

That a terrestrial species such as Man may exist on Mars or or on some other body outside the Earth

The play, " The Martians," no doubt tends to keep alive the popular idea, but at p. 251 of *Charles Darwin and the Origin of Species*, by Prof. E. B. Poulton, D.Sc., F.R.S., we read :—

" . . . in a letter to the Duke of Argyll (Sept. 23, 1878), Darwin gave a more complete answer to the extreme supporters of the hypothesis of multiple origins, at the same time refuting the opinion—not uncommon even at the present day—that a terrestrial species such as man may exist on Mars or on some other body outside the earth. For Darwin shows that, in order to produce the same species twice over, the same material must have been subject to the same selection at every stage, right back to the unknown starting-point of evolution."

" Regarding the habitability of Mars, it is very probable that there are types of life of some kind or other on that planet. The two gases hydrogen and carbon are closely associated with life on our planet ; and they also seem to be largely distributed throughout the universe. We must therefore conclude that they are present on Mars. At the same time it is beyond our power to imagine what form the progress of evolution may have assumed. It is quite possible that air as thin as that on Mars would sustain life in some form. It is probable that vegetable life of a comparatively high type exists on it ; and that almost implies the presence of animal life of some sort ; for we have already seen that there appears to be some evidence for the existence of water vapour in its atmosphere ; and some, though less at times, of the existence of water vapour on its surface in variable quantities ; and some direct evidence of the presence of vegetation."—Charles Whyte, LL.D., F.R.A.S., p. 78, *Our Solar System and the Stellar Universe* (1923).

Vide *Plurality of Worlds*, Dr. Whewell.

That the Earth revolves on its Axis 365¼ times in a Year

There are 365¼ days in a year, and the change from light to dark is due to the rotation of the Earth on its axis, hence very naturally it is thought the number of revolutions per annum must be 365¼, but as a fact the number of revolutions

per annum is 366¼, *i.e.*, exactly one more than the number of days, and this one more is due to the revolution of the Earth once round the Sun in a year.

We have just used the word "day" in its common sense of 24 hours from midnight to midnight. Strictly, and by astronomers, this is called a "mean solar day," the word "mean" being necessary because the duration of a solar day varies slightly according to the position of the Earth in its orbit.

At midday the Sun is at his highest point in the heavens, and if the Earth did not rotate round the Sun every solar day would be of exactly the same length, and the Earth would make 365¼ revolutions on its axis in 365¼ days. These solar days would then be exactly equal to what is called a sidereal (L. *Sidus*, a star) day. By a sidereal day is meant the period from when any particular star is at its highest point in the heavens to when it is next in the same position. There are 366¼ such sidereal days in a year of 365¼ mean solar days.

This is not a matter to follow without a diagram, model, or *viva voce* explanation, but the following experiment may help to make it clear. Place a half-crown and a florin flat and separate on a table to represent the Sun and Earth respectively. Start with the figure of Britannia on the florin in the normal, erect position. Now slide the florin contra clock-wise round the half-crown, always keeping Britannia erect. If this occurred in the case of the Earth and Sun it would mean that there would be only one solar "day" (*i.e.*, complete change from light to dark) in a year, and the solar "day" and solar year would be of exactly the same length! It would also mean that there would never be a sidereal day, for the same stars would always be vertically overhead.

Next keep the florin on the same spot on the table, but make it revolve contra clock-wise about an axis perpendicular to the table and passing through the centre of the coin. Britannia then turns head over heels (or more strictly heels over head!). If this occurred in our solar system our solar days would be all of exactly the same length and each would be equal to a sidereal day of the present actual length, but there would be no change of seasons.

Next while slowly translating the florin (still flat on the table) *once* contra clock-wise round the half-crown (to repre-

sent the motion of the Earth round the Sun in a year) causes the florin to rotate contra clock-wise on its own axis (perpendicular to the table), so as to keep Britannia's trident always pointing to the centre of the Sun. If this actually occurred in our solar system it would mean that the half of the Earth facing the Sun would have perpetual sunshine while the other half would be in perpetual darkness, *i.e.*, there would be no change from light to dark, and a sidereal "day" would be equal to our present year, and though there would be no "day" (change from light to dark) the Earth would have rotated exactly *once* on its axis. This is the one extra rotation in the paradox we are considering.

Lastly, repeat the last experiment but make the florin rotate several times on its axis, but always ending with Britannia erect. Then it will be found that there is always *one* more sidereal day than there are solar days.

We may conclude with a quotation :—

"The length of the year, that is to say, of the interval of time which elapses between two successive passages of the Earth through the same point of its orbit, is about 365¼ mean solar days. How many entire rotations on its own axis does our globe execute during that time?—366¼; in other words, if the number of the solar days of the year is 365¼, the number of the sidereal days is exactly greater by unity.

"This is a direct consequence of the yearly revolution of the Earth, combined with its diurnal movement of rotation." —Amédée Guillemin, *The Heavens*, 1883, p. 99.

The problem is also dealt with in *Ency. Brit.*, Vol. II., p. 772.

That the Stars may be seen by the Naked Eye in Daylight from the bottom of a Deep Well or Tall Chimney

At p. 227 of No. 6, Vol. XXVI. (1916), of the *Journal of the British Astronomical Association* will be found a paper by the Rev. W. F. A. Ellison entitled "Stars in Daylight" from which is quoted the following :—

"It is a well known popular belief that the stars can be seen in daylight from the bottom of a deep well, shaft, or tall chimney. Like many other popular beliefs, it survives only because no one has ever taken the trouble to investigate it. Even if it were true, the observation could rarely be made, as the star or stars to be seen would

have to be fairly bright, and would have to pass through the zenith of the particular shaft or chimney used. There are no stars of the first magnitude, and only seven of the second which could fulfil this latter condition anywhere in the British Islands. Of the seven, four are in the Ursa Major, two in Cassiopeia, and one in Draco. β and ϵ Ursae Majoris and α Cassiopeiæ have nearly the same declination, lying between 56° and 57° N. An observer having access to a shaft in Central Scotland might possibly observe one of these stars as it passed his zenith. An observer at Ripon might see γ, or one at Alnwick ζ. An observer in Sutherlandshire might see β Cassiopeiæ, or one in the latitude of Greenwich γ Draconis. Stars below second magnitude may be left out of account, supposing the observation to be possible. But, as we may have reason to conclude presently, it is not. The whole idea is merely a myth. It is one of those statements which people hear and repeat without thought or examination. A very little scientific reasoning, even without experiment, will be sufficient to dispose of it. For, *what is it which hides* the stars in the daytime ? It is merely the glare of our atmosphere illuminated by the Sun's rays. As the atmosphere extends to a height of 50 miles or more above the Earth's surface, a shaft or chimney 100 to 200 feet high could do but little to take away that glare, and anyone who has ever actually looked up from the bottom of such a shaft (as I have from the bottom of a colliery, 900 feet below the surface) must have been struck not by the *darkness* of the little disc of sky visible, but by its *dazzling brilliance.* If Sirius himself could have peeped down that shaft, his light would have been hopelessly lost in the glare. But it was when I first began to look for stars in daylight with an equatorially mounted telescope, that I realised the hopeless absurdity of the popular belief. . . .

" We see then, from the foregoing considerations, that the visibility of stars through a telescope in daylight is due to two things : (a) The telescope increases the light of the star in the ratio of the square of its aperture ; (b) it also reduces the intrinsic brightness of the background. A well or shaft does neither of these things, both of which are functions of the *lenses* of the telescope, not of the *tube.* It is also pertinent to mention that I have seen Vega in daylight with a 18 in. reflector *with the eye-piece removed.* Here we

have proof that the light-gathering power of the large mirror was able so to multiply the light of the stellar point as to render it visible *although there was no magnification* to dilute the light of the sky background."

That the Earth travels at a Constant Speed round the Sun

The Earth's path round the Sun measures more than 583,000,000 miles and as it does the journey in a year its mean speed of translation is 18 miles a *second*. The path or orbit is nearly circular, but is really an ellipse with the Sun at one of the two *foci*, and the speed of translation is greater when the Earth is near the Sun than when it is further away. There are four important points in this path, viz., March 21, the Vernal equinox; June 22, the Summer solstice; Sept. 24, the Autumnal equinox; and Dec. 21, the Winter solstice. These are spaced equally apart as regards distance in miles, but the respective times taken to do these four portions of the yearly journey are 93 days, 94 days, 89 days, and 89 days, so we see the speed is not constant, and the difference between the maximum speed, when the Earth is near the Winter solstice, and minimum speed when it is near the Summer solstice is even greater than these figures indicate. We see then that the year in the northern hemisphere is divided into the Spring and Summer portion of 187 days, and the Autumn and Winter portion of 178 days. In the Antipodes these periods are reversed.

That the Full Moon disperses Clouds

"The Moon and Clouds.

By Joseph H. Elgie, M.B.A.A.

"Does the moon when full, or nearly full, drive away the clouds? It is astonishing how widely spread the belief is to that effect in this country.

"The unscientific may be pardoned, perhaps, for holding such a curious belief when that renowned astronomer, Sir John Herschel, once declared that the full moon cleared the sky of cloud and brought a clear night.

It was asserted, too, by the late Rev. Edmund Ledger, who was well known as a writer and lecturer on astronomy, that the result of long-continued observations indicated that

near the time of full moon the nights are less cloudy than at other times.

"One may well ask why, in the name of reason, the clouds should melt in the moonshine, as snow might in hot sunshine?

"It is clear that the belief is based on the old-fashioned idea that our satellite sent out such an amount of heat that the clouds were literally dried up.

"A fascinating theory, indeed, but an utterly groundless one.

"The heat radiated by the full moon is, at this distance, so insignificant that it cannot possibly have any effect, either one way or the other, upon terrestrial clouds.

"The secret of the whole thing to my mind is that the absence of cloud is made visible, and therefore more noticeable, when there is a bright moon than when there is no moon."—*Evening News*, Nov. 27, 1917.

That the Daily Variation in the Length of a Day is Constant throughout the Year

This is one of the few of the 189 errors which Sir Thomas Browne, M.D., refuted in his *Vulgar Errors* in 1646 which still needs to be pointed out as a fallacy. Chapter IV. of his Book VI. starts thus:—

"Fourthly, there are certain vulgar opinions concerning days of the year, and conclusions popularly deduced from certain days of the month; men commonly believing the days increase and decrease equally in the whole year; which notwithstanding is very repugnant unto truth. For they increase in the month of March, almost as much as in the two months of Jan. and Feb.: and decrease as much in Sept., as they do in July and Aug. For the days increase or decrease according to the declination of the Sun, that is, its deviation northward or southward from the equator. Now this digression is not equal, but near the equinoxial intersections, it is right and greater, near the solstices more oblique and lesser."

That the so-called "Fixed" Stars do not move

"*And meteors fright the fixed stars of heaven.*"—King Richard II., II., iv., 9.

This fallacy has been partly dealt with elsewhere.

As far as we know nothing is fixed in the stellar universe. All the heavenly bodies are moving with velocities of several miles a second. Our own Earth is translated 18 *miles per second*. Our Sun is not fixed, but with us, and the rest of his planets is moving towards the star Vega. For all this the relative positions of the stars forming the various constellations appear to us to be the same as they did to the ancients two or three thousand years ago. The reason for this is that the motions of the stars, though sometimes very great, are extremely small compared with their stupendous distances from us, so that they appear to us to have no motion at all. For example, Dr. Elkin, an American astronomer, attempted to measure the distance of Arcturus by taking observations of it at the ends of a diameter of the Earth's orbit. That is he made one set of observations in, say, January and the second in July. These two " stations " would thus form the ends of a base line 186,000,000 miles long, but for all this the star's displacement was equivalent to the apparent distance between the heads of two pins placed an inch apart and viewed from a distance of 180 miles !

That Comets affect the Weather

" The question has been raised whether the extraordinary weather experienced lately in different parts of the world is in any way due to the influence of the new daylight comet, and the point was submitted yesterday to Sir David Gill, the famous astronomer, who was for many years Astronomer Royal at the Cape.

" ' This comet has had absolutely no influence on the weather,' declared Sir David. ' Its mass is quite insignificant, and apart from that fact it is impossible to imagine that it can have had any influence, seeing that we are having all kinds of different weather in different parts of the earth. One cause could not produce these differing effects.

" ' Neither this comet nor any other comet has produced any effect upon our weather. It is true we have heard of " comet wines," but that is simply because the appearance of a comet has coincided with a good vintage year. The comet had nothing whatever to do with the good vintage.' "—*Daily Mail*, Jan. 27, 1910.

That if there were Inhabitants on the Moon they would see the "Earth-rise"

Mr. H. H. Statham, F.R.I.B.A., said at the Casual Club on November 9, 1916, that some celebrated artist had painted a picture of the "Earth-rise as seen from the Moon." The Moon always presents (day and night) the same face towards the Earth because she rotates on her axis in exactly the same time, a lunar month, that she takes to revolve round the Earth. Consequently the Earth is always in full view of the "inhabitants" of our side of the Moon, but though in full view, sometimes the Earth is unilluminated, and sometimes it is wholly bright. Briefly, as seen from the Moon, the Earth passes through phases, but does not rise, being always in a fixed position in regard to any point on the surface of the Moon.

That the Moon is absolutely devoid of any Atmosphere

"It has been calculated that even if the atmospheric density at the surface [of the Moon] be only 1/10,000 of that on earth (a quantity which it may well exceed), then, since the rate of decrease is so much slower than on the earth, at a height of something over 40 miles the densities of the atmospheres would be equal, and at still greater heights that of the Moon would be the denser. Now most of the meteors that enter our air are completely burnt up at greater heights than this, so that the thin lunar atmosphere may actually be as effective for stopping meteors as our own."—*Nature*, No. 2686, April, 1921.

That most of the Stars visible to the Naked Eye are Solid and Dense

"Stars in a truly gaseous state exist in great numbers, although at first sight they are scarcely to be discriminated from dense stars like our Sun. Not only so, but gaseous stars are the most powerful light-givers, so that they force themselves on our attention. Many of the most familiar stars are of this kind—Aldebaran, Canopus, Arcturus, Antares; and it would be safe to say that three-quarters of the naked eye stars are in this diffuse state."—Prof. A. S. Eddington, F.R.S.; *Nature*, Sept. 9, 1920, p. 14.

That the Sun Sets Earliest on December 22nd each year, that being the Shortest Day

A simple diagram is necessary to make this clear. One which answers this purpose excellently was published in the *Daily Mail*, Dec. 8, 1920. On Dec. 22, the shortest day, the Sun did not rise at the latest time in the year, nor did he set the earliest on that date. The date of his earliest setting was Dec. 9, when he set at 3.49 p.m. On Dec. 17 he set at 3.50 (rose at 8.02) and on Dec. 22 he set at 3.51, thus on that date, as far as setting was concerned, the day was 2 mins. *longer* than on Dec. 9, but on this latter date he rose at 7.55½ a.m., while on Dec. 22 he rose at 8.06, thus the day was *shortened* between Dec. 9 and 22 by 11 mins. due to late rising, and only lengthened 2 mins. by later setting. The late rising continued to be later until Jan. 2, when the time of rising was the latest, viz., 8.08 a.m. On that day the time of setting was 3.59 p.m. The foregoing applies to the latitude of London in the year 1920. The variation from year to year is small.

That the fixed stars are other Worlds and possibly inhabited

" When my good stars that were my former guides
Have empty left their orbs and shot their fires
Into the abysm of hell."—Antony and Cleopatra, III., xii., 145.

" Stars, hide your fires!"—Macbeth, I., iv., 50.

" The skies are painted with unnumbered sparks,
They are all fire and every one doth shine."
Julius Cæsar, III., i., 63.

" Doubt thou, the stars are fire ;
Doubt that the Sun doth move ; "—Hamlet, II., ii., 116.

Considering the ease with which this question might be looked up in an elementary work on astronomy it is remarkable how common the belief is, but of course the difficulty is that we do not as a rule look up matters concerning which we have no doubts, and so we continue in our ignorance.

The so-called fixed stars are suns and hence quite uninhabitable. Some such stars or suns have systems of planets revolving round them, and each of such stars represents a planetary system similar to our own.

Our Sun is not fixed, nor are the other suns, but their movement is so small compared with their inconceivable distance from us that for practical purposes as far as our Earth is concerned they are fixed.

Vide *Of the Plurality of Worlds*, by William Whewell, D.D., F.R.S. He doubted the existence of inhabitants of other planetary worlds.

BIOLOGY

That the Dark-skinned and Raven-haired People in Cornwall, the North-West of Scotland and Ireland are Descendants of some of the Shipwrecked Warriors of the Spanish Armada

Miss L. P. Steele-Hutton, M.A. (St. Andrews), wrote: "This will not hold water as a theory, I believe, and yet one hears it constantly. Fair Island (between the Orkneys and the Shetlands) is the case which I really looked into, but anthropology seems to account for the race quite otherwise—at pre-Celtic, and perhaps even non-Aryan."

Vide also *The Origin of the Aryans* (Contemporary Science Series).

That Bacilli, Microbes, or Disease Germs, belong to the Animal Kingdom

We hear as much nowadays about germs as we do about golf, prices, taxes, motor-cars, and wireless! Microbes, germs, bacteria, bacilli, animalcules, and micro-organisms are all names vulgarly used for the same thing. The name *bacteria* is derived from a Greek word meaning "rod-like," and *bacilli* is from a Latin word with the same meaning. Hence more strictly the terms bacteria and bacilli are applied only to those micro-organisms which are rod-like in form. If they are spheroidal in form they are called *micrococci*; if spiral, *spirilla*. Germs, microbes, and micro-organisms may be used as synonyms, but the last term is to be preferred.

Many of these micro-organisms are furnished with excessively delicate thread-like processes (*flagella*) which may be likened to the roots of higher plants; they feed on animal matter, and for these and other reasons too technical to enumerate, scientists consider these organisms belong to the Vegetable Kingdom.

As to their size, Dr. Percy Frankland, F.R.S., remarks that four hundred million of them can lie quite comfortably on one square inch of surface without overlapping! This is about 50 times the population of London, which has an area of about 80 square *miles*.

To show how " up-to-date " some criminals are, we give the following cablegram from New York which appeared in the *Daily Telegraph* a few years ago :—

" An exciting incident occurred in a Third Avenue cable-car this morning. It was crowded with passengers at the time, and as a man was leaving it he threw three small phials among the passengers who were sitting in the car. They picked up the bottles, and found them to be labelled respectively ' Diphtheria,' ' Pneumonia,' and ' Cholera.' The distributor exclaimed that there were enough disease germs in the bottles to kill a cityful of people. This caused a stampede, and in the frantic struggles of the passengers to get out of the car, one woman had her leg broken. The phials were secured, and when their contents were analysed later in the day, it was ascertained that they really did contain the germs of the diseases whose names they bore. The man who threw the bottles escaped in the confusion."

It would be interesting to know whether any of the passengers developed any of the above diseases. No doubt they all thought they had the symptoms of all three diseases at once ! The moral of this story is that evidently the public do not think that the " micro-organism theory of disease " is all rubbish !

It may be well to mention here that animalcula (Latin, little animals) belong to the Animal Kingdom. They are entirely different from bacilli, being perhaps 100 and 1,000 fold larger, more highly organised, and non-pathogenic.

Examples of animalcula are:—Vorticella, Rotifera, Cyclops, and Hydra.

In conclusion, there is some confusion whether " animalcula " is singular or plural, and when it is thought to be singular, the incorrect form " animalculæ " is written for the plural.

Singular.	*Plural.*
Animalculum,	Animalcula.
Animalcule,	Animalcules.
Bacillus,	Bacilli.
Bacterium,	Bacteria.
Microbe,	Microbes.
Microbion,	Microbia.

That all kinds of Bacteria or Bacilli and their Spores can be Killed by Boiling them in Water for a Few Minutes

Mr. S. L. Mosley, the curator of the Huddersfield Museum, kindly wrote on Nov. 24, 1896 :—

" Dry fungus spores have been heated to 120° C. (248° F.) without being killed. Some bacteria are said to resist boiling. Dr. Dallinger educated monads, which usually live at 18° C. (64⅖° F.), to live and thrive at 70° C. (158° F.)."

It is significant also that Colonel J. Lane Notter, M.D., and Colonel R. H. Firth, F.R.C.S., in their *Hygiene*, say : " Practical experience goes to show that an exposure to 220° F. for eight hours, or 250° F. for one hour, or 270° F. for a quarter of an hour is sufficient to disinfect ordinary infected materials."

That Polygamy largely predominates among Mohammedans

About November, 1907, an article appeared in a French magazine in which the writer said the custom of a man having several wives is not so common as is generally believed. Mohammedan law allows every man four wives, but in the case of a poor man one is as much as he can afford to keep, and, even with the very rich, monogamy is becoming more and more the custom, while there are rarely more than two wives, each of whom has a separate home and quite distinct family arrangements.

In the *Daily Mail* of Oct. 23, 1908, there appeared an article on " A Woman's Life in Bosnia," signed " F. A.," from which the following is extracted :—

" There are two harems near Mostar, to which the lady visitor with introductions may gain admittance. The word ' harem ' means ' home,' and the modern Turk is inclining more and more towards monogamy. This evolution of a polygamous race is a very significant answer to those who would solve the problem of the superfluous women of Europe by instituting polygamy. These faddists hold that Nature evidently intended it. The Mohammedan race have tried the system for centuries, and are abandoning it.

" The harem, then, consists of the master of the house, his wife, and their female relations, and it is no more a harem, in the abused sense of the term, than the average one-man family so often seen in England. From the moment she is veiled, in the early 'teens, a woman in Mostar is not allowed to be seen unveiled by any man except her near relations,

and she neither sees nor is seen by her husband until the wedding ceremony."

In *The Turkish People: Their Social Life, Religious Beliefs, and Institutions, and Domestic Life*, by Lucy M. J. Garnet, it is written, "A harem far from meriting the epithets of 'detestable prison' and 'place of degradation,' often applied to such abodes by superficial travellers, is, as a rule, the most cheerful and commodious division of a house."

Grace Ellison in her work, *An Englishwoman in a Turkish Harem*, also explodes the popular idea.

When the author was in Serajevo in May, 1907, it was arranged that the ladies of the party should visit the harem of a well-to-do official of the town. The men of our party were, of course, very envious of the privilege, but the envy changed to laughter when, on the return of our women-folk, we learned that the harem contained only *one* wife! A curious psychological fact, too, was that the ladies were obviously disappointed with their visit because the Turk was *not* a polygamist!

That a race of women-warriors called Amazons ever existed

C. R. Enock, F.R.G.S., says in *The Andes and the Amazon* (2nd ed., p. 280): "The Nahumedes are an almost extinct tribe, on the river of the same name. They are those who attacked the explorer Orellana, who believed that these savages, with their chemises or shirts, and long hair, were women-warriors, or 'Amazons,' and which name was given to the great river. This must be the explanation of the supposed existence of women-warriors in these regions, for no legend or history among the Indians can now be found relating to any Empire of women."

Harms. Ency. says: "Amazons, according to Greek legend, a war-like race of women . . . who are said to have cut off their right breasts to give them freedom in using weapons; hence their name from Greek *a*, 'without,' and *mazos*, 'breast.' . . . There are tales of Amazons also in South America . . . and women were until recently armed and drilled in Dahomey, West Africa." The author remembers seeing some of these Dahomey women several years ago at the Crystal Palace, and very fine specimens of womanhood they were!

Mr. Martyn refers to these Dahomey women in his *Life in the Legion* thus :—

"Anyone inclined to sympathise with the Amazons on account of their sex, and look upon the combat between them and our men as unequal, may take it from me that their sympathy would be misplaced. These young women are far and away the best men in the Dahomeyan army, and woman to man were quite a match for any of us. They were armed with Spencer repeating carbines, and made much better use of them than the men made of their rifles ; and for work at close quarters they had a small heavy-backed chopping sword or knife, very much like a South American machete, with which they did great execution. They fought like unchained demons, and if driven into a corner did not disdain the use of their teeth and nails. One of them was seized and disarmed by a Marine Infantry man in this fight, but she was so far from being beaten that she at once turned on her captor and set about biting his nose off. The man yelled out for his mother, but the lady would not leave off worrying him until she was cut down by the sword of an officer who rushed to the man's assistance. The uniform of these female warriors was a sort of kilted divided skirt of blue cotton stuff. This garment barely reached to the knees. It was supported at the waist by a leather belt which carried the cartridge pouches. The upper part of their bodies was quite nude, but the head was covered with a coquettish red fez, or tarboosh, into which was stuck an eagle's feather. These ladies were all exceedingly well developed, and some of them were very handsome, in a nigger kind of way."

That Gipsies are descended from Egyptians

Mr. W. A. Dutt, the author and authority on gipsies and East Anglia, wrote on Jan. 30, 1911 :—

"This fallacy is attributable to the fact that the gipsies formerly called themselves Egyptians and are so described in old English burial registers, etc.

"A writer in the *Gentleman's Magazine*, Vol. LXXII., 291, states his reasons for believing that the gipsies formerly inhabited Egypt.

"'Common opinion deriveth them from Egypt, and from thence they derive themselves . . . according to their own account hereof. . . . Which account notwith-

standing is of little probability. . . . That they are not Egyptians, Bellonius maketh evident.'—Sir Thomas Browne, *Vulgar Errors*, Book VI., Chap. XIII.

" Gipsies are now believed to be descended from a people who inhabited North-West India. It was discovered by Rüdiger in 1777 that *Romani*, the gipsy language, is closely connected with the Indian tongues, although it is more archaic than any tongue spoken in modern India, and is the nearest living relative to Sanscrit."

The *Harms. Ency.* gives 3⅓ pp. to the subject of gipsies.

Archbishop Trench, D.D., p. 122, *The Study of Words:* " So, too, it seems to lie in ' gipsy,' or Egyptian, that Egypt was the original home of these wanderers from the East. We know that when they made their first appearance in Europe early in the fifteenth century, it was so believed by many, and the name preserves a record of the mistake. That it was a mistake their language leaves no doubt ; making evident as it does that they are indeed wanderers from a more distant East, an outcast people from India itself. ' Bohemians,' as they are called by the French, involves an error of a like character to ours, testifies to the fact that at their first apparition they were supposed by the common people in France to be expelled Hussites of Bohemia."

That the Jews are a " pure " Race, i.e., that they have not Inter-married with other Races of Mankind

" As an example of the difficulties which are connected with the use of the word ' race ' we may take its application to the Jews. In origin the Jewish people appear to have arisen by the mixture of two diverse ancient stocks, the Hittites (or early Armenians) and the Phœnicians. Their dispersal, first of all at the date of the ' captivity,' and later upon the destruction of Jerusalem, led to large admixture with other distinct racial groups. The present Jewish communities in Europe descend from communities established here and there after the great dispersal resulting from the fall of Jerusalem, and were at once increased by considerable accessions of converted ' Gentiles.' The assumption that the Jews have made few or no converts is no longer tenable. They have assimilated very largely, even in the earliest times, from Syrian, European, and African races. In exile they have been (especially in earlier days) far more of a religious body than a broken nation. Yet the erroneous

notion is common that you cannot have a better example than that offered by the Jews of a 'pure' race, persisting from the most remote antiquity."—Sir Ray Lankester, K.C.B., F.R.S., in *The Daily Telegraph*, Aug. 20, 1913.

That the Offspring of an Animal is affected by a previous Impregnation

The fact that there is a scientific name—telegony—for the sequence of events indicated in the above heading indicates that the theory has had supporters of some repute. According to Darwin, "farmers in South Brazil are convinced that mares which have once borne mules, when subsequently put to horses, are extremely liable to produce colts striped like a mule." The chief case upon which the theory of telegony rests is that of a mare owned by Lord Morton and reported to the Royal Society in 1820, but this has been upset by later experiments by Prof. Cossar Ewart and published by him under the title *The Penycuik Experiments*, 1899.

In consequence of the belief in telegony it is often the practice to put a basset bitch to a bull-dog and kill the resulting litter. Then the same bitch is mated to a basset dog. The object of this procedure is to produce the bull-dog strain of endurance in the second litter. A dog-fancier friend of mine tells me that he frequently has well-bred bitches offered to him cheap because they have been supposed to be spoiled by having accidentally got mated to some mongrel dog. Horse breeders buy good mares cheap in similar circumstances.

The Field, about 1900, had some information on the subject, and other information will be found in *Evolution*, by Prof. J. A. Thomson and Patrick Geddes; and in a *Guide to Zebras, Hybrids* (1900) by Prof. Cossar Ewart. There is a long and interesting article in *Harms. Ency.* on "Heredity," which deals with telegony and has a long bibliography. An article by Sir Ray Lankester, K.C.B., F.R.S., on telegony appeared in *The Daily Telegraph* of Aug. 11, 1913, in which he sums up the case in the following words:—

"As things at present stand, there is no evidence resulting from deliberate experiment or from exact observation and record of the natural breeding of animals to justify us in holding, as an established fact, that the offspring of a given

sire and dam is, even in rare cases, affected by the previous mating of the dam with another sire. Naturalists would be deeply interested in the production of even one indisputable instance of this occurrence."

Edgar Schuster, M.A., D.Sc., p. 202, *Eugenics:* "The theory of telegony, if applied to mankind, would mean that if a woman had a child by one husband, and subsequently another child by another husband, the peculiarities of the first husband would exert an influence, not only on his own child but on the other man's. The supposed instances are for the most part derived from the breeding of animals, and are largely due to mistakes in the records of parentage. A scientific breeder of fowls, on whose well-ordered farm telegony was unknown, has defined it when exhibited by hens as 'she flew over the fence.' The definition is rich in meaning if poor in syntax. If one supposes that she flew over in secrecy in order to consort with a previous and preferable mate and then flew back again, we can well understand how a 'clear case' may have arisen.

"Although not all the better authenticated instances are of this kind, other explanations which accord better than telegony with generally accepted biological views are invariably forthcoming."

J. A. S. Watson, p. 31, *Heredity*, also discredits the theory.

That War improves the Physique of a Nation

The following are extracts from a column headed "Some Fallacies About War," by Dr. C. W. Saleeby, in the *Pall Mall Gazette* of Dec. 29, 1913:—

"In ancient days, when the whole manhood of a nation was its army, and men fought in hand-to-hand encounters, war may well have been an agent which prevented racial degeneration by constantly weeding out the physically inadequate and feeble. It would be a kind of 'natural selection.' . . .

"But those times are long past, and the recorded history of man returns a very different verdict upon war from its point of view. For *the purposes of war, nations now select their healthiest young manhood, and during war the death-rate among those selected is appallingly high. Thus war as practised by civilised communities is what I call dysgenic, a direct agent of racial degeneration.* Fortunately it only attacks one sex, and that parentally the less important, but its

effects have, even so, been fatal enough. An admirable paper on this subject was read by Professor Vernon Kellogg, of Stanford University, California, at the International Eugenics Congress in London last year.

"But the most distinguished of the students of eugenics and war is Principal Starr Jordan, who has recently concluded his series of lectures in our great academic centres. His little book, *The Human Harvest* (published in this country by Alston Rivers), should be in every eugenic library. The argument from Rome is specially noteworthy and is approved by such an authority as Prof. J. Arthur Thomson, of Aberdeen. Recruits were always wanted for the protection of the far-flung Roman frontier. The recruiting officer, I take it, said to the physically inferior, 'You are not good enough to be a Roman soldier. Stay at home and be a Roman father.' As Professor Thomson says, 'The wars of the Roman Empire rooted out the best and left Rome to a mob'; or, in Dr. Jordan's phrase, *Vir* was replaced by *Homo*.

". . . . Professor Seeck, of Greifeswald, reckons that, in Rome, '*Out of every hundred thousand strong men, eighty thousand were slain. Out of every hundred thousand weaklings ninety to ninety-five thousand were left to survive.*' . . . Sir Robert Baden-Powell is making for himself a name among the greatest soldiers of all time, because he hates and exposes the champions of war—if, indeed, any such be left after the recent record of the Balkans—because he honours 'Peace Scouts,' as he calls them, like Livingstone and Captain Scott, and because he is now giving to the boys of this country and other countries all the world over everything that war can give, without its hideous consequences for the moral of the individual and the race."

That full White Parents, with Negro Ancestry on one or both sides, sometimes have "Black" Children

This is (or used to be) a common belief in South Africa, and is considered an example of what is called a "throw-back":—

"An interesting study on heredity of skin colour in negro-white crosses is published by Dr. C. B. Davenport in No. 188 of the Publications of the Carnegie Institution (1913). The data, which include very careful observations on more than 600 individuals, were collected chiefly in Bermuda and Jamaica. The difficulties in exactly

determining the grade of skin colour, and more especially in getting trustworthy information about the ancestry, are explained, and reason is given for regarding the results as generally trustworthy. It is concluded that the results obtained fit on the whole rather well with the hypothesis that the negro is homozygous for two factors for the production of black pigment, both of which are absent from the European. Since each of these factors may be present singly or in duplicate among the descendants of a cross between negro and white, there may be five conditions—none, one, two, three, or four of the factors being present. When the whole number of individuals examined is plotted in a polygon, there are, in fact, five maxima. It is concluded that the stories of the production of 'black' offspring by two full whites with negro ancestry on one or both sides are mythical. There is a yellow pigment in the negro independent of the black, which may appear strongly in the paler hybrids. Eye-colour and hair-colour and form are dealt with more shortly. There is no correlation between skin-colour and hair-form, but strong correlation between skin and hair-colour."—*Nature*, Feb. 19, 1914.

It should be noticed that this information conflicts with that given by Dr. Edgar Schuster, p. 99, *Eugenics* (1912), and quoted in connection with the fallacy about white parents and black children.

That Criminals, as a general rule, possess a Low Forehead, and what is usually understood by a "low type of face"

A Scotch friend, in calling the author's attention to this fallacy, said, "It is quite a popular mistake. Criminals are just ordinary looking people, like you and me!"

The popular conception is more easily represented by sketches than by words, and in a Blue Book, by Dr. Goring, entitled *The English Criminal*, published Aug. 1, 1913, there are some drawings by artists of the heads of criminals as they were imagined to be by those artists, and these are compared with drawings of the heads of actual criminals. The comparison is most striking, the artists having conceived awful looking creatures, while the real thing is quite ordinary looking!

Dr. Goring says, "As individuals, criminals possess no characteristics, physical or mental, which are not shared by

all people. The only difference is one of degree." His investigations show that there is no definite criminal type as was thought to be the case even by so great a criminologist as Lombroso. The general characteristics of the English convict are that he is defective in physical strength, weight, stature and mental capacity, but the head measurements of criminals differ but little from those of men up at Oxford and Cambridge. Dr. Goring also brings out clearly that a low forehead does not connote criminality and a high one intelligence.

Now that photos of so many criminals are published by the illustrated daily papers, this fallacy should soon die out—except that all fallacies are die-hards! *Vide* Sir Francis Galton, F.R.S., p. 259, *Memories of My Life.*

That Production of Offspring is the Dominant Instinct of the Higher Animals

Taking what is usually (though the point may be disputed, especially with the facts of the Great European War before us) considered to be the highest animal, man, first, we are surprised that many people should hold the view expressed in the above heading, for workers among the poor (who have far larger families than the middle and upper classes) well know that they often quite resent the appearance of another mouth to feed and body to clothe. Dr. C. V. Drysdale, of the Malthusian League, could give plenty of information in refutation of the above error. The matter is dealt with by Mr. Pycraft in his *Courtship of Animals*, in which he points out that the tremendous power of " mate-hunger " has been overlooked by a strange confusion of cause and effect. Sir Ray Lankester, K.C.B., F.R.S., referred to the matter in his weekly article in the *Daily Telegraph* of Mar. 24, 1914, in which he quoted Mr. Pycraft, and said, " Almost universally its [' mate-hunger's '] sequel, the production of offspring, has been regarded as the dominant instinct in the higher animals. This view has no foundation in fact. ' Desire, for the sake of the pleasure which its gratification affords, and not its consequences, is the only hold on life which any race possesses. And it is true, both in the case of man himself and of the beasts which perish.' I agree (says Sir Ray) with Mr. Pycraft that those whose business it is, for one reason or another, to study these emotions, know well that ' mate-hunger ' may be as ravenous as food-hunger, and that, ex-

ceptions apart, it is immensely more insistent in the males than in the females. . . . It is idle to speak of an equality between the sexes in this matter, either in regard to animals or in the human race. Dogmatism and the frequent repetition of pretty platitudes, as Mr. Pycraft says, will not alter what nature has ordained. The male is dominated by the desire to gratify the sexual appetite ; in the female this is modified by the stimulation of other instincts concerned with the care of offspring. Amorousness is the underlying factor which has shaped, and is sustaining, lower animals. The motive force in this has not been the desire for offspring, but for the satisfaction of the elemental animal passion. We must not prefer man-made sophistries as to life and its significance to the knowledge of the truth concerning its mysteries. Many difficult social problems would become intelligible if the facts of mate-hunger were faced and acknowledged. Much that is considered contrary to human nature, and either outrageous or ridiculous, would be understood and wisely dealt with if knowledge of nature, including man's nature, were cultivated, and took the place of vain assertions as to what should be, accompanied by ignorance of what is."

For such as his opinion and feelings are worth, the author wishes strongly to support the above views. It has always appeared to him stupid for the human race to pretend (or to try to act as if) it does not belong to the animal kingdom, and as many of the so-called lower animals can give us points, even on " morals," he does not see why some of us should be so anxious to dissociate ourselves from them. In conclusion, there is no getting away from the fact that there is a considerable percentage of illegitimate births in the world, but surely none will argue that the parents in those cases desired offspring. It must also be remembered that the marital act is not discontinued when the couple have found by experience that they will not be blessed by having children, nor when, having had some children, they cannot have any more.

That the Australian Aborigines are the Lowest of the Human Race

Of the many official sectional guide books to the British Museum one of the cheapest is that to the *Specimens Illustrating the Races of Mankind* (*Anthropology*), at the Natural History Museum, 2nd Ed., 1912, 8vo. 36 pp., 16 pl., by R. Lydekker, F.R.S.

At p. 18 it is written of the above aborigines, " The shape of the head also differs from that in the negro, the forehead being high and the cheek bones prominent. Indeed, the profile of the head may approach the European type. . . . The idea that Australians are the lowest of mankind is quite erroneous ; for in mental characters these people seem to approximate in many respects much more to the Caucasian than to the Negro standard."

" The astonishment which I felt on first seeing a party of Fuegians on a wild and broken shore will never be forgotten by me, for the reflection at once rushed to my mind—such were our ancestors. These men were absolutely naked and bedaubed with paint, their long hair was tangled, their mouths frothed with excitement, and their expression was wild, startled and distrustful. They possessed hardly any arts, and like wild animals lived on what they could catch ; they had no government, and were merciless to everyone not of their own small tribe."—Darwin, p. 946, *The Descent of Man* (1901).

" The Fuegians rank amongst the lowest barbarians." *Ibid.*, p. 98.

That Twins are usually much Alike in Appearance

" One would have expected that twins would commonly be found to possess a certain average likeness to one another ; that a few would greatly exceed that average likeness, and a few would greatly fall short of it. But this is not at all the case. Extreme similarity and extreme dissimilarity between twins of the same sex are nearly as common as moderate resemblance. When the twins are a boy and a girl, they are never closely alike ; in fact, their origin is never due to the development of two germinal spots in the same ovum."—Sir Francis Galton, F.R.S., p. 156, *Inquiries into Human Faculty*.

That in the Breeding of Animals the Male is prepotent with regard to certain Characters, and the Female with regard to others

" The result of a cross is therefore the same, whether this or that variety be used as the male or as the female parent. The common beliefs of breeders, that the male is prepotent with certain characters, the female with regard to others,

have no real foundation, or are due to the operation of causes which have nothing to do with heredity, in the strict sense. There appears to be some interesting exceptions to this rule, which we will consider later."—J. A. S. Watson, B.Sc., p. 56, *Heredity*.

That every Character which appears in the course of Individual Development points to the Possession of a Similar Character by the more or less remote Ancestors

" Another fallacy, which has attracted less attention than it deserves, should also be pointed out. This is the common idea that every character which appears in the course of individual development points to the possession of a similar character by the more or less remote ancestors. This, however, is by no means the case. Many young fishes, for instance, escape from the egg while they have still attached to them an enormous mass of good yolk, but we need not imagine that their ancestors ever habitually carried such a burden. Again, an enormous number of marine animals pass through a free-swimming larval stage. Now, practically all these larvæ are perfectly transparent ; but it does not follow that the marine animals in question are all descended from transparent ancestors. . . . "—W. B. Drummond, M.B., C.M., F.R.C.P.E., p. 48, *An Introduction to Child Study*.

That the Human Embryo is at one stage a little Fish, at another a little Amphibian, and so on

" If we accept the theory of evolution, as we have accepted it for the purposes of this chapter, it will at once be seen that the story of development is a brief summary of the story of descent. So, at least, evolutionists interpret the metamorphoses that have been described. In Haeckel's well-known phrase, ontogeny repeats phylogeny—the development of the individual repeats the development of the race. This is the doctrine of recapitulation—a doctrine which is to be interpreted in a wide and metaphorical sense. The students must beware of the popular travesty of the doctrine, to the effect that the human embryo at one stage is a little fish, at another a little amphibian, and so on. The embryo does in some respects resemble a fish embryo. Fish-like characters do appear. But the fish stage is passed by without being passed through. A tadpole is not a fish, but it does

possess some fish-like characters."—W. B. Drummond, M.B., C.M., F.R.C.P.E., p. 48, *An Introduction to Child Study*.

That according to Darwin Man is descended from Monkeys

This is about as "popular" a fallacy as it is possible to get, as the following story perhaps illustrates:—The mistress asked her cook how she liked the new butler. "Oh, we all likes 'im very much: he explains things so nicely." "Explains things; what do you mean, cook?" "Well, mum, last night, for instance, 'e explained as 'ow we all be descended from Mr. Darwin."

There is so much material with which to refute this fallacy that a selection is difficult.

We will begin with a quotation from p. 51 of *An Introduction to Child Study* (1907) by W. B. Drummond, M.B., C.M., F.R.C.P.E.:—"I need scarcely say that no evolutionist believes that men are descended from monkeys, but it is held that if man's line of descent is traced far enough back it will somewhere meet the stock from which our existing monkeys and apes are descended."

Far better, perhaps, for us to let Darwin defend himself, hence we make the following extracts from his *Descent of Man* and we have not far to go for the first, for at p. 3, line 1, we read: "The sole object of this work is to consider, firstly, whether man, like every other species, is descended from some pre-existing form"; p. 4, "The conclusion that man is the co-descendant with other species of some ancient, lower, and extinct form, is not in any degree new."; p. 19, ". . . probably derived from our remote semi-human progenitors"; p. 35, ". . . if we admit their descent from a common progenitor . . ."; p. 60, "He who rejects with scorn the belief that the shape of his own canines, and their occasional great development in other men, are due to our early forefathers, will probably reveal, by sneering, the line of his descent."; p. 94, ". . . primeval men, and even their ape-like progenitors, probably lived in society."; p. 166, ". . . it is probable that the early ape-like progenitors of man were likewise social;"; p. 239, "And as man from a genealogical point of view belongs to the Catarhine or Old World stock, we must conclude, however much the conclusion may revolt our pride, that our early progenitors would have been properly thus designated. Haeckel has come to this same conclusion. But we must

not fall into the error of supposing that the early progenitor of the whole Simian stock, including man, was identical with, or even closely resembled, any existing ape or monkey." ; p. 900, " Man, as I have attempted to show, is certainly descended from some ape-like creature." ; p. 927, " . . . and a crowd of analogous facts—all point in the plainest manner to the conclusion that man is the co-descendant with other mammals of a common progenitor." ; p. 930, " We thus learn that man is descended from a hairy, tailed quadruped, probably arboreal in its habits, and an inhabitant of the Old World." ; p. 946, " He who has seen a savage in his native land will not feel much shame, if forced to acknowledge that the blood of some more humble creature flows in his veins. For my own part I would as soon be descended from that heroic little monkey, who braved his dreaded enemy in order to save the life of his keeper, or from that old baboon, who descending from the mountains, carried away in triumph his young comrade from a crowd of astonished dogs—as from a savage who delights to torture his enemies, offers up bloody sacrifices, practises infanticide without remorse, treats his wives like slaves, knows no decency, and is haunted by the grossest superstitions."

Lady Mary Stuart Wortley Montagu, writing on July 31, 1718 (O.S.) from Tunis to Abbé Conti, said : " Their posture in sitting, the colour of their skin, their lank black hair falling on each side of their faces, their features, and the shape of their limbs, differs so little from their own country people, the baboons, 'tis hard to fancy them a distinct race ; I could not help thinking there had been some ancient alliances between them."

In conclusion, readers are referred to a diagram given by Sir Arthur Keith, M.D., F.R.S., at 820 of *The Graphic* of Dec. 18, 1915, refuting most clearly this popular fallacy and showing what an enormous way we have to go back before we come to the common ancestor of man and monkeys.

That the Marriages of Cousins (or Consanguineous Marriages) necessarily lead to Injurious Consequences

" Man scans with scrupulous care the character and pedigree of his horses, cattle, and dogs before he matches them ; but when he comes to his own marriage he rarely, or never, takes any care. . . . Both sexes ought to refrain from marriage if they are in any marked degree

inferior in body or mind ; but such hopes are Utopian and will never be even partially realised until the laws of inheritance are thoroughly known. Everyone does good service who aids towards this end. When the principles of breeding and inheritance are better understood we shall not hear ignorant members of our legislature rejecting with scorn a plan for ascertaining whether or not consanguineous marriages are injurious to man."—Darwin, p. 944, *The Descent of Man*. .

On July 17, 1870, Darwin wrote the following letter to Sir John Lubbock :—

" As I hear that the census will be brought before the House to-morrow, I write to say how much I hope that you will express your opinion on the desirability of queries in relation to consanguineous marriages being inserted. As you are aware, I have made experiments on the subject during several years ; and it is my clear conviction that there is now ample evidence of the existence of a great physiological law, rendering an inquiry with reference to mankind of much importance. In England and in many parts of Europe, the marriages of cousins are objected to from their supposed injurious consequences ; but this belief rests on no direct evidence. It is, therefore, manifestly desirable that the belief should either be proved false, or should be confirmed, so that in this latter case the marriages of cousins might be discouraged. . . .

" It is, moreover, much to be wished that the truth of the often repeated assertion, that consanguineous marriages lead to deafness, dumbness, blindness, etc., should be ascertained ; and all such assertions could be easily tested by the returns from a single census."

The suggestion was considered in a House of Commons Committee on July 26, 1870, and a fairly full account of it was given by Prof. E. B. Poulton, D.Sc., F.R.S., in his Galton Lecture delivered on Feb. 16, 1916. Suffice it to state here that the result of the voting in Committee was Ayes 45, Noes 92, amply showing that England's neglect of Science is of no recent origin. It was this result that caused Darwin to write the last sentence in the paragraph quoted from *The Descent of Man*.

" Public opinion has been generally set against marriages of first cousins, but little evidence has been recorded to support it. If two cousins who marry are entirely free

from latent defects, there does not seem to be any ground for supposing that their children are more likely to be defective than those of people unconnected by close kinship. But it is almost impossible to say definitely that no latent defect is present. [But this difficulty is not confined to cases of cousins.—Ed.] Where the same abnormality exists in the germ plasm of both partners, it is more likely that their children will be affected, than if the defect present on one side is different from that on the other. The latent characters of cousins are much more likely to be similar than those of two unrelated persons, so it follows that, on the whole, it is safer for cousins not to intermarry."—Edgar Schuster, M.A., D.Sc., p. 178, *Eugenics*.

Vide *Notes and Queries*, July 3, 1920, p. 16.

That White Parents can never properly have a "Black" Child, or Negro Parents a White one

It is fortunate that the occurrence is a very rare one, but judging by the reliability of the two authorities about to be cited, it is pretty certain it does occur sometimes.

Dr. Edgar Schuster, M.A., D.Sc., p. 99, *Eugenics*, ". . . . it has been found, now that a somewhat closer attention has been given to the facts, that white or negro babies are sometimes born to parents from whom they would hardly be expected. Mendalism often provides a more charitable and more probable explanation of such phenomena than the suggestion of conjugal infidelity."

Sir Robert Armstrong-Jones, M.D., the specialist in nervous and mental diseases, lectured at Gresham College, London, early in Jan., 1919, and in the *Daily Mail* of Jan. 17, 1919, he was reported to have said, " I knew a woman who, although descended from a negro several generations previously, had come of white parents, grandparents, and great-grandparents, and was to all intents and purposes a white. She married a white man, and yet they had a black baby. This was known to be a case where a separate entity—in this case colour—asserted itself after several generations."

It should be noted that under " black offspring from white parents " some information is given which conflicts with this.

That all Hybrids or "Mules" are Infertile

The difficulty of accounting for the origin of a great number of popular fallacies has from time to time been mentioned.

This one is an instance of the survival of an opinion formerly held by those who ought to have known better, and though later naturalists do know better, it takes time for knowledge to spread, still more so when erroneous information has got the start. Hence one reason why the author has spent 29 years of spare time on this book.

In the *Harms. Ency., sub* " Hybrid " we read, " Naturalists believed formerly that all hybrids were necessarily sterile. The belief was associated with the dogma of the permanency of species. . . .

" Fertile hybrids are not common among animals ; but Darwin himself reared healthy young from a pair of hybrids between domestic goose (*Anser ferus*) and the Chinese goose (*A. cygnoides*), which are very distinct species. Hybrids between these two species are apparently common, and quite fertile. Among plants not a few florist's flowers are hybrids, and yet are perfectly fertile. Such are many petunias, pelargoniums, rhododendrons, crinums, and so on."

" So far as our knowledge goes, all the domesticated races —for example, of dogs, of pigeons, of fowls among animals ; and of cabbages, of peas, of *Primula sinensis*, and many more among plants—when intercrossed among themselves never produce this sterility in their mongrels, though the races are often distinct enough to pass for species."—Prof. W. Bateson, F.R.S., p. 76, *Nature*, July 15, 1922.

Sub " Mule " in *Harms. Ency.* we read, " The fact that mules [the offspring of the mare and the male ass] are apparently absolutely sterile *inter se* is largely responsible for the belief, so firmly fixed until Darwin's time, that hybrids are always infertile."

That the Birth-rate of Jews is greater than of non-Jews

At p. 42, *Nature*, March 21, 1918, Prof. J. Brodetsky reviewed *The Jewish Child :* Its History, Folk-lore, Biology and Sociology, by W. M. Feldman, and in that review he stated :—

" One of the most important chapters in the book is that which discusses the vital statistics of the Jewish child. At a time when the problem of infant mortality looms large in the public eye, it is interesting to note that among Jews the infant mortality is, at all ages of child-life, considerably lower than

among the general population, and not only in England, but in all other countries. The chances of surviving the critical first year are also much greater among Jewish infants. Contrary to the popular belief, the Jewish birth-rate is less, and yet their degree of increase is greater than that of non-Jews. This is because their infant mortality is considerably lower. As Leroy-Beaulieu puts it, the Jews ' bring fewer children into the world, but they bring more of them to maturity.' ' This low infantile mortality,' Dr. Feldman reminds us, ' is not due to any inherent racial vitality in the Jewish child, but is due to the almost universal prevalence of breast-feeding among Jewesses, to the lesser incidence or almost entire absence of transmissible taints resulting from diseases acquired by the parents in the worship of Venus and Bacchus, and lastly to the great general care bestowed on their children by Jewish parents, who fly to the doctor for almost every infantile ailment.' "

That Red Haired People are Treacherous, Deceitful and Passionate

ROS. : " *His very hair is of the dissembling colour.*"

CEL. : " *Something browner than Judas's : marry, his kisses are Judas's own children.*"

ROS. : " *I'faith, his hair is of a good colour.*"

CEL. : " *An excellent colour : your chestnut was ever the only colour.*"—As You Like It, III., iv., 7-12.

This is certainly one of the more popular of Popular Fallacies, but this does not make it the easier to deal with. In the nature of things it would be very difficult to get reliable information, and in such investigations a few cases will not suffice—many must be used to obtain an average. It is a pity the late Sir Francis Galton, F.R.S., did not make it the subject of one of his inquiries into human characteristics.

The author has failed to find any satisfactory evidence either for or against the idea, but it should be clearly understood in *all* such cases that *it is the duty of those who propound such theories to support them by reliable facts and experiments which may be checked by others.* It is not for such people to give vent to loose statements and then expect others to disprove them, and to claim that their statements are true because nobody has disproved them !

The quotation from Shakespeare, the only one the author has found on the subject of the colour of hair, says nothing about the colour being red : on the contrary, it is implied

that chesnut colour is what is first referred to as "the dissembling colour."

Mr. W. A. Dutt on Jan. 30, 1911, sent the following: "He that has red hair is proud, envious, and deceitful."—Aristotle.

"There is something wrong about red-haired men." Prof. Karl Pearson, F.R.S.; lecture at Birmingham; *Echo*, Nov. 23, 1903.

The following quotation is from Walter Johnson's *Folk-Memory* (1908), pp. 57-9, where the matter is dealt with :—

"May not the dislike in England of red-haired people," asks Mr. Johnson, "have originated in the antipathy felt by the dark Neolithic folk for the red-haired Celts, and been strengthened by the struggles of one Celtic group with another, and further increased when the coalesced Britons were in turn harassed by the Danes?"

The author's question in *Notes and Queries* resulted in a number of replies [Sept. 2 and 16; and Nov. 4, 1916], all agreeing that the prejudice exists, and suggesting that it may be due to Cain and Judas being anciently represented as having red hair. This shows the prejudice is old, for an artist dealing with such subjects would adopt the colour to which prejudice was attached, and would never dream of worrying about historical accuracy! Others suggest "the aversion to the red-haired Danes and Scots," or to Sut or Typhon in Egyptian mythology as he was depicted as red, yellowish, or sandy.

Lt. Wm. Jaggard suggested that, "The prejudice is of somewhat modern growth, for Queen Elizabeth's ruddy-locks caused that colour, in her day, to be the fashionable tint, and the prejudice was then against dark hair."

T. F. Thiselton-Dyer, M.A., devotes Chapter XII. of his *Folk-Lore of Women* (1905) to 'Red-haired girls,' but it leaves the subject much in the same position as does the matter in *Notes and Queries*, though he does say, "Of course this is only prejudice."

All this is interesting, but it does not prove or disprove the popular idea, and as the idea should not have been started without a good foundation on fact, and should not be continued without that foundation now being evident, the author prefers to discredit the idea, though he fully admits that a red-haired child at a school affords the other children a butt for their wit!

Since the last paragraph was written the following appeared at p. 5, *University Correspondent*, Jan. 1, 1923 :—

" Red-haired boys and girls to-day are the most conscientious, athletic, and popular ; there is no ground for the suspicion and dislike with which old writers viewed them. The statement was made by the eminent eugenist Prof. Karl Pearson, F.R.S., in an address to London teachers last month."

As far as the author's observations have gone, girls with red hair almost always have nice complexions and fine skins.

That the Germans are chiefly a Teutonic race

Dr. Chalmers Mitchell, M.A., D.Sc., F.R.S., speaking at the Casual Club on Nov. 11, 1915, said that the Mediterranean and Iberian race had very long heads, a long head being one in which the length from back to front is great compared with the width from side to side. That the Alpine and Asiatic race had very round heads, *i.e.*, the length and width are nearly equal, and that " ' Teutonic ' is an entirely wrong name. The German nation is not Teutonic at all. A tall, blond race is the true Teutonic race. The English and Scandinavians and a large part of France is very much more Teutonic than the Germans. The Germans are very largely Russians as regards race."

That a Woman who Suckles her Child cannot Conceive until the Child is Weaned

This is usually true but not always so, as will be seen from the following quotation from *Advice to a Wife*, by Pye H. Chavasse, F.R.C.S., p. 98 : " Menstruation generally ceases *entirely* in pregnancy and during suckling. . . . Some ladies, though comparatively few, menstruate during suckling ; when they do, it may be considered not as the rule, but as the exception. It is said, in such instances, that they are more likely to conceive ; and no doubt they are, as menstruation is an indication of a proneness to conception."

That Creoles are the Offspring of Mixed (Dark and White) Parents

Sir Francis Galton, F.R.S., p. 17, *English Men of Science* (1874), says, " I trust the reader knows what ' Creoles ' are—

namely, the descendants of white families long settled in a tropical colony; and that he does not confound the term with 'mulattoes.'"

A mulatto is the offspring of white and "black" parents. A quadroon is the offspring of white and mulatto parents, the meaning being a *quarter* dark. Similarly an octoroon has *one-eighth* dark blood.

Ency. Brit. has: "Creole (Spanish *Criollo*), is a term which primarily was used to denote an inhabitant of the Spanish colonies who was descended from the European settlers, as distinguished from the aborigines, the negroes, and mulattoes."

The Harms. Ency. has (*sub* mulatto): "In the West Indies and Latin America the various shades of hybridism are distinguished by special names. Thus *Creole* is a white in Spanish America, a black in Brazil; a white and mestizo cross in Peru." And (*sub* Creole), "a name given to people born and naturalised in the West Indies or South American colonies, but of European (usually Spanish or French) origin as distinguished from the offspring of mixed blood, such as the mulattoes and quadroons, from negroes and from aborigines. The name has no connotation of colour, and latterly has been more loosely used for people, even negroes, born in the West Indies whose descent is not entirely European."

That Marriage usually takes place between Persons having opposite Characteristics, e.g., Tall with Short, Dark with Fair, etc.

The statement "you usually marry your opposite" is commonly heard, but the investigations of Sir Francis Galton, F.R.S., do not bear this out. They are recorded in his *English Men of Science, their Nature and Nurture* (1874), beginning at p. 27, where we read, "It has been frequently asserted that certain physical peculiarities in the parents clash and that others combine happily in the offspring." His inquiries related to temperament, colour of hair, and stoutness or slimness, and at p. 29, where he considers the tabular results, he says: "The foregoing tables show results bearing on the question whether harmony or contrast prevails in the physical characteristics of the parents. I think they must be accepted as decidedly in favour of harmony. The grand totals which they give are

78 cases of harmony, 31 of contrast, and 56 of indifference. In short, there is more purity of breed in scientific men than would have resulted from haphazard marriages. In the temperaments (which he divides into Nervous, Sanguine, Bilious, and Lymphatic) of their parents, harmony strongly prevails over contrast, the proportion being 5 to 1 in favour of the former."

That the Principle of Evolution was not thought of until the time of Darwin

Prof. T. H. Huxley, F.R.S., p. 150, *Science and Hebrew Tradition* (1893), says: "Is Mr. Gladstone, of all people in the world, disposed to ignore the founders of Greek philosophy, to say nothing of Indian sages to whom evolution was a familiar notion ages before Paul of Tarsus was born?"

While at p. 183 Huxley recommends his readers to consult the second part (by Prof. Sully) of the article on Evolution in the 9th ed. of *Ency. Brit.*: "He will there find it said that in some of the philosophies of ancient India, the idea of evolution is clearly expressed. . . . What little knowledge I have of the matter . . . leads me to think that Mr. Sully might have spoken much more strongly as to the evolutionary character of Indian philosophy, and especially of that of the Buddhists."

That Illegitimate Children are Mentally and Physically Weaker than those Born in Wedlock

This was suggested by Mr. Cohen, who was defending a baby-farmer at the Old Bailey before Mr. Justice Darling on Sept. 19, 1919. His lordship said, "Come, Mr. Cohen, that won't do; what about William the Conqueror? And I rather think Hercules was illegitimate." Of course Hercules is a *legendary* hero, but his lordship was correct as to his supposed origin, for he is said to have been the son of Alcmene, the wife of Amphitryon, King of Thebes, by Zeus.

Ency. Brit. gives the numerical statistics of illegitimacy, but says nothing about health.

On asking Dr. A. Percy Allan, M.D. (Lond.), he said there is no difference in babies born in or out of wedlock. It is possible that neglect, or the need of means, may affect adversely the health and physique of illegitimate children of a more mature age.

BIOGRAPHY

That Captain Webb met his Death in swimming over Niagara Falls

It was in the whirlpool rapids that Captain Webb unfortunately met his death, and not in the falls. His unsuccessful attempt to swim the rapids was made in 1883. The rapids are 2½ miles below the falls and a mile above the whirlpool. At the rapids the channel is only 300 ft. wide, and the velocity of the water is so great that at the centre of the river the water is said to be 20 ft. higher than it is at the banks.

That George Washington, when a boy, cut down a cherry tree belonging to his father, and that the latter told him he would rather have him (George) cut down 10,000 trees than tell one lie.

Most of the authorities are silent on this matter, but *Ency. Brit.* says: "The story of the hatchet and the cherry tree and similar tales are quite apocryphal, having been coined by Washington's most popular biographer, Weems."

"Nothing is known of Washington's childhood, notwithstanding the many stories which have gathered about his name."—*Chamb. Ency.*

It is a pity that some chroniclers are not more conscientious. The recording of facts cannot be too carefully done, as it is often impossible at the time to estimate the ultimate importance of the records.

That Beau Brummell was a fop and dressed extravagantly

In *Piccadilly to Pall Mall: Manners, Morals, and Man*, by Ralph Nevill and Chas. E. Jerningham, will be found the following note on Beau Brummell:—

"Brummell was the Bonaparte of the beaumonde. Dress, address, daring, discretion, and distinction: these were the qualities which, in combination, made him the arbiter of fashion. He possessed more than any man before or has since that originality which is *not* eccentricity, and that affectation which was artistic as well as attractive. He was so conscious of power that he was unconscious of criticism,

and, possessing that confidence which is another faith, although of obscure origin, he moved the mountains of Mayfair. Dandies, however, influence only their own generation, not the generations that follow ; theirs is a personal power which is inexplicable when their personality is removed. How great was the power of Beau Brummell when he was at the height of his glory may be imagined from the reported saying of Lord Byron that he would rather be Brummell than Bonaparte. That was, however, when dandyism was a fine art in London. The buck, the dandy, and the beau have long since had their day, and left no successors behind them."

The *Dic. of Nat. Biog.* says, " By no means a fop, Brummell was never extravagant in his dress, which was characterised rather by a studied moderation."

" Brummell was so thoroughly a beau that he escaped classification with those who approached, but did not equal him. He was not a fop, for a fop is a fool, and Brummell was no fool. He was not a coxcomb, for a coxcomb desires attention before all things, and will wear any absurdity rather than be ignored ; and Brummell considered it the worst of taste to be so dressed that public attention was attracted." Mrs. Clare Jerrold in *The Beau and the Dandies* (1910).

That Thomas à Becket was the Son of Gilbert à Becket and a Saracen woman who set him (G. à B.) free when he was in her father's Prison in the Holy Land, and followed him to London, knowing only two English words, " London " and " Gilbert."

The story is given in full detail in one of Bell's Reading Books (*Short Lives of Great Englishmen*, p. 17), even to the touching picture of the head of the firm of merchants—G. Becket & Co.—rushing into the street only just in the nick of time to catch his fair deliverer fainting in his arms !

On Jan. 23, 1908, Dr. B. Kingsford, at The Casual Club, in a paper on Thomas à Becket, said, " As for the Saracen legend connected with his birth, of course, that is exploded."

Prof. Cyril Ransome, M.A., does not give the story, nor does Maunder or the *Cyclopædia of Names*, but Mrs. Roe (*Sketches from English History*, p. 69) does. Mr. C. E. Clark (*The Mistakes We Make*, p. 181) refutes the popular idea, and *Ency. Brit.* says, " . . . his parents were of Norman extraction, if indeed they were not actually immigrants from Normandy."

Cham. Biog. Dic. says, " Thomas Becket, Archbishop of Canterbury, was born in London in 1118 of Norman parentage, his father being a wealthy merchant. That his mother was a love-lorn Saracen is a pretty but baseless tradition."

" . . . This singular story has found credence in recent times with Dr. Giles, M. Thierry, Mr. Froude and M. Michelet ; but by one of the most judicious modern biographers of Becket, Canon Robertson, it is rejected as a legendary tale, wholly unsupported by the evidence of those chroniclers who were Becket's contemporaries."—*Book of Days*, Vol. II., p. 784.

" The old tale . . . has now long since been dropped by everyone." From a long article by Walter Rye at pp. 233-4, *Notes and Queries*, Mar. 24, 1923. *Vide* p. 86, *Short History of the English People*, J. R. Green.

That Belisarius, towards the end of his life, was Blind and Starving

Dr. Brewer supports the popular idea, but Mr. C. E. Clark refutes it, and so does Freeman (*Historical Essays*), in the words, " He was the greatest general of the Byzantine Empire. The tale that in old age he was blind and obliged to beg his bread from door to door is false. " The exploits of Belisarius, looked at in themselves, are enough to place him in the very first rank of military commanders. When we consider the circumstances under which they were achieved, he may fairly claim the first place of all. Hannibal is his only rival, as Heraclius had no Justinian to thwart him at home."

Ency. Brit. states, " The fiction of Belisarius wandering as a blind beggar through the streets of Constantinople, which has been adopted by Marmoutel in his *Bélisaire*, and by various painters and poets, seems to have been invented by Tzetzes, a writer of the 12th century."

Belisarius was born about A.D. 505 and died A.D. 565.

That Jeanie Cameron was the Mistress of Prince Charlie

An article entitled " The real Jeanie Cameron" appeared at p. 4 of *T.P.'s Weekly* of Jan. 3, 1908, from which the following information is abstracted, " Mrs. Jenny Cameron, as the English people styled her, was a woman of some notoriety, and was the subject of no little discussion during the last Jacobite insurrection in 1745. The pamphlets at that time had a good deal to say about her. It was generally supposed

that she accompanied Prince Charlie as his mistress during the whole of the '45, and it is on this understanding that Fielding causes his heroine to be mistaken for her. As a matter of fact, Mrs. Jean Cameron never saw the Prince in all her life. . . . The whole rumour as to her being the mistress of Prince Charlie appears to have arisen from some misapprehension."

That the Irish Jaunting Car was invented by Bianconi

Most of the authorities seem silent on this point, but Mr. H. Frith, p. 63, *Romance of Engineering*, considers it a mistake, and states that the car is of older date than Bianconi's arrival in Ireland, whose communications Bianconi did so much to open up.

That Faraday invented the Electro-Magnet

The following article appeared at p. 722, *The Electrical Engineer* of Nov. 20, 1908:—

"WILLIAM STURGEON.

"Sir William H. Bailey in an address delivered last Friday before the Old Mancunians' Association gave a comprehensive review of the many noted men who have added to the honour of the district. Of *William Sturgeon, the inventor of the soft-iron magnet,* he said: 'Famous for ever will be the name of William Sturgeon, of Lancaster, the son of a drunken shoemaker, a private soldier in the Artillery, who after his discharge became an eminent and much respected member of the Manchester Literary and Philosophical Society. He is buried in Prestwich Churchyard. He was a journalist, electrician, and tutor to Dr. Joule, after he had been taught mathematics by Dalton. His great invention of the soft-iron magnet is the unit, the parent, the main principle in all the electric bells, telephones, phonographs, telegraph instruments, dynamos, and must be used in producing the electric light and the electric transmission of power and energy of these modern times. For years people thought that Faraday had invented the soft-iron magnet. Dr. Joule investigated the matter, and has placed on record that in 1825 the Society of Arts made a present to William Sturgeon of £25 for his invention of the electro-magnet. He contributed to the Manchester newspapers and to *Bradshaw's Manchester Journal*, and his "Annals of

Electricity" may be had at the old bookshops. In fifty years these books will be worth their weight in gold. He was buried in Prestwich Churchyard, after receiving a little annuity from Lord John Russell. Sturgeon's name will always take very high rank among the great electricians of history.'"

Prof. Silvanus P. Thompson, D.Sc., F.R.S., in his *Michael Faraday, his Life and Work*, p. 102, ". . . . and in Sturgeon's invention of the soft-iron electro-magnet . . . ." and at p. 226, " In so perfect a character it would be marvellous if there were not some flaw. His [Faraday's] persistent ignoring of Sturgeon, and his attribution of the invention of the electro-magnet to Moll and Henry, whose work was frankly based on Sturgeon's, is simply inexplicable." The second quotation makes it clear that Faraday did not claim the invention as his own.

It was in 1820 that the Danish physicist Oersted discovered the prime fact of electro-magnetism, *i.e.*, the deflection which is produced upon a magnetic needle by an electric current passing along a wire placed either under or over the needle.

One of Faraday's great discoveries was electro-magnetic rotations. Dr. S. P. Thompson, at p. 83 of his work, already quoted, says, " In 1821, the year of his [Faraday's] marriage, came the first of the important scientific discoveries which brought him international fame. This was the discovery of the electro-magnetic rotations."

Another of his great discoveries was that of magneto-electric induction, which was made in 1831.

That "Stephenson's Link Motion" was invented by George Stephenson

In *Natural Philosophy* by A. P. Deschanel, Vol. II., p. 513, it is written: " The method usually employed for reversing engines is known as Stephenson's link motion, having been first employed in locomotives constructed by Robert Stephenson, son of the maker of the 'Rocket.' The merit of the invention belongs to one or both of two workmen in his employ—Williams, a draughtsman, who first designed it, and Howe, a pattern-maker, who, being employed by Williams to construct a model of his invention, introduced some important improvements.

W. F. Pettigrew, M.I.C.E., M.I.M.E., p. 150, *A Manual*

of Locomotive Engineering, 1909, "This gear [the "gab" motion] was entirely abandoned for the invention of Howe, known as the Stephenson link motion."

That the first Atlantic Cable was laid by Cyrus Field

The whole story is a long and fascinating one and those who are interested we refer to *The Life Story of Sir Charles Tilston Bright* by his son, Sir Chas. Bright. Also to *The Story of the Atlantic Cable* by the same author.

At p. 39 of the former we read*: "In July, 1856, Mr. Cyrus Field, the deputy-chairman of the New York and Newfoundland Telegraph Company, left America for London. . . . On Sept. 29, 1856, an agreement was entered into between Mr. J. W. Brett, Mr. Field, and myself, by which we mutually, and on equal terms, engaged to exert ourselves with the view to, and for the purpose of, forming a company for establishing and working of electric telegraphic communication between Newfoundland and Ireland, such company to be called the 'Atlantic Telegraph Company,' or by such other name as the parties hereto should jointly agree upon." Sir Chas. Bright goes on to state that the aforesaid three promoters and projectors were a little later joined by Mr. Edward Orange Wildman Whitehouse, originally a medical practitioner. Mr. Cyrus West Field was a retired merchant. Mr. John Watkins Brett was a capitalist who, with his brother, had previously taken the foremost part in establishing the first lines to France and Belgium. Sir Chas. Bright started as a telegraph clerk at the age of 15 and at 24 was Engineer-in-Chief to the Atlantic Telegraph Company.

The next step was the formation of the "Atlantic" Company, the first meeting of the shareholders of which took place on Dec. 9, 1856. Mr. William Brown, M.P., was chairman and other directors were:—Mr. Samuel Gurney, M.P., Mr. T. H. Brooking, deputy chairman; Mr. Lampson, vice-chairman; and Prof. William Thomson (afterwards Lord Kelvin, F.R.S.). Chas. Bright was appointed Engineer-in-Chief, Mr. Whitehouse electrician, Mr. Cyrus Field general manager, and later managing director.

* This quotation is itself a quotation from the words of Sir Chas. Bright in his Presidential Address to the Society of Telegraph Engineers and Electricians (now the Inst. Elec. Engineers) in 1887.

After many difficulties, including the breaking of the cable several times, Bright was able to telegraph to his wife on Aug. 5, 1858, "Atlantic cable laid! Signals received both ways," and on the next day *The Times'* leading article stated, "Mr. Bright, having landed the end of the Atlantic cable at Valentia, has brought to a successful termination his anxious and difficult task of linking the Old World with the New."

We think we have given sufficient evidence to show that the laying of the first Atlantic cable was by no means carried out by only one man, but that the man who was responsible for, and in charge of, the actual physical laying of the cable was the late Sir Chas. Bright.

That the Fall of an Apple suggested to Newton his theory of Gravitation, and that having got the idea of Universal Gravitation in 1665, he did not publish it till 1685, because in making some calculations he had used wrong data concerning the size and mass of the Earth, and waited until he obtained better data

The only authority for the story is Voltaire, who had it from Newton's favourite niece, who with her husband lived with, and kept house for, Newton all his later life.

At p. 391 of *Engineering* of Mar. 19, 1909, there is a report of the third lecture by Sir J. J. Thomson, F.R.S., on "The Properties of Matter" delivered at the Royal Institute on Mar. 13, 1909, from which we quote: "A great many stories were told concerning Newton's discovery, many of which did him scant justice. In a picture* in the Royal Institution, for instance, one of these stories was illustrated, Newton being shown contemplating the fall of an apple. Here, indeed, the artist had given him grounds for contemplation, as the apple was shown in equilibrium on a very steep bank. It was not in any sense accurate to say that Newton found out why the apple fell. What he really did prove was that whatever force caused the fall of the apple was the same as that which kept the Moon circulating round the Earth, and the planets round the Sun. So that the force in question extended from earth to heaven. He disbelieved, moreover, another popular story about Newton, who got the idea of

* An oil painting by Robt. Hannan, Manager of the Roy. Inst., 1894-5. Exhibited at the Royal Academy in 1856.

universal gravitation in 1666, but did not publish it till 1685. The usual explanation given of this long interval was that he made a calculation of the gravitation between the Earth and the Moon, using wrong data as to the size of the former, and hence got a result a few per cent. out. He was, the story went, so scrupulous as to accuracy that he put his calculations away until, later on, he got better data as to the Earth's dimensions, and found then an absolute agreement between his theory and his calculation. . . . The story . . . had been definitely disproved by his letters and MSS. now in the possession of the Earl of Portsmouth, which showed exactly where his real difficulty lay. It took Newton all the years in question to calculate the difference in the attraction of the Earth at its surface and at the Moon. If his law were true, he could calculate easily enough the attraction at the Moon . . . The attraction of a stone at the Earth's surface was, however, enormously more difficult to calculate, and required the work of a Newton for several years before it was solved. . . . He established, ultimately, the most beautiful theorem that so long as the body attracted was outside of the Earth, the attraction on it was exactly the same as if the whole mass of the Earth were concentrated at the centre. It was the solution of this problem which delayed the publication of Newton's theory. . . ."

Apparently there is no reference to the apple story (the book has no index) in *An Account of Sir Isaac Newton's Philosophical Discoveries*, by Colin Maclaurin, A.M., F.R.S., 3rd ed., 1775.

"Though others had considered cosmical forces as governed by the general laws of motion, it does not appear that they had identified such forces with the force of terrestrial gravity. This step in Newton's discoveries has generally been the most spoken of by superficial thinkers; and a false kind of interest has been attached to it, from the story of its being suggested by the fall of an apple. The popular mind is caught by the character of an eventful narrative which the anecdote gives to this occurrence; and by the antithesis which makes a profound theory appear the result of a trivial accident. How inappropriate is such a view of the matter we shall soon see. The narrative of the progress of Newton's thoughts is given by Pemberton (who had it from Newton himself) in his preface to his *View of*

Newton's Philosophy, and by Voltaire, who had it from Mrs. Conduitt, Newton's niece. 'The first thoughts,' we are told, 'which gave rise to his *Principia*, he had when he retired from Cambridge, in 1666, on account of the plague (he was then twenty-four years of age). As he sat alone in a garden, he fell into a speculation on the power of gravity; that as this power is not found sensibly diminished at the remotest distance from the center (*sic*) of the earth to which we can give rise, neither at the tops of the loftiest buildings, nor even on the summits of the highest mountains, it appeared to him reasonable to conclude that this power must extend much further than was usually thought: Why not as high as the moon? said he to himself; and if so, her motion must be influenced by it; perhaps she is retained in her orbit thereby.' "—W. Whewell, D.D., Vol. II., p. 121, *History of the Inductive Sciences*, 3rd ed., 1857.

" It is supposed that it was at Woolsthorpe in the summer of 1666 that Newton's thoughts were directed to the subject of gravity. Voltaire is the authority for the well-known anecdote about the apple. He had his information from Newton's favourite niece, Catherine Barton, who married Conduitt, a fellow of the Royal Society, and one of Newton's intimate friends. How much truth there is in what is a plausible and a favourite story can never be known, but it is certain that tradition marked a tree as that from which the apple fell, till 1820, when, owing to decay, the tree was cut down and its wood carefully preserved."—*Ency. Brit.*, 11th ed., Vol. XIX., p. 585d.

Gauss, the great mathematician, says, " The history of the apple is too absurd. Whether the apple fell or not, how can anyone believe that such a discovery could in that way be accelerated or retarded? Undoubtedly, the occurrence was something of this sort. There comes to Newton a stupid importunate man, who asks him how he hit upon his great discovery. When Newton had convinced himself what a noodle he had to do with, and wanted to get rid of the man, he told him that an apple fell on his nose; and this made the matter quite clear to the man, and he went away satisfied."

Sir David Brewster, F.R.S., did not refer to the matter in his *Life of Sir Isaac Newton*, published in 1831, but in his enlarged work, *Memoirs of the Life Writings and Dis-*

coveries of Sir Isaac Newton, published in 1855, we find at p. 25 of Vol. I., the following :—

". . . . it was therefore in the autumn of that year [1665], and not in that of 1666, that the apple is said to have fallen from the tree at Woolsthorpe, and suggested to Newton the idea of gravity."

To the above there is this footnote :—" Neither Pemberton nor Whiston, who received from Newton himself the history of his first ideas of gravity, records the story of the falling apple. It was mentioned, however, to Voltaire by Catherine Barton, Newton's niece, and to Mr. Green by Martin Folkes, the President of the Royal Society."

" The story that this train of thought was aroused by seeing an apple fall is due to Voltaire, and is given in his *Philosophie de Newton*, 3^{me} partie, Chap. III. Voltaire had it from Newton's step-niece, Mrs. Conduitt.* For many years tradition marked the tree in the garden at Woolsthorpe : it was shown to Sir D. Brewster in 1814 and was taken down in 1820."—*Dic. of Nat. Biography*, Vol. XL. (1894), p. 372.

A far more likely cause of Newton's giving thought to the attraction between bodies are the speculations on the subject of Sir Francis Bacon, recorded in his *Novum Organum*, at pp. 255 and 280 of the edition by Pickering, 1850. This work of Bacon was published for the first time in 1620 (Newton being born in 1642), and seeing Bacon's reputation as a scientist, Newton could not have failed to study his works.

At p. 153 of *Heroes of Science, Astronomers* (1882), by E. J. C. Morton, B.A., we read, " And in this year also the first idea of the law of gravitation occurred to him. For, according to the account given by his niece, Catherine Barton, to Voltaire, having been driven away from Cambridge by the plague, he was sitting in the garden at Woolsthorpe, thinking of the laws of motion, when he saw an apple fall from a tree."

To this there is the following footnote :—" This story of the apple is sometimes doubted. It rests on the authority given in the text, and on the authority of Martin Folkes, President of the Royal Society. It was not mentioned in the two accounts given by Sir Isaac Newton himself to Pemberton and Whiston ; but there is nothing in his account inconsistent with it."

* *Neé* Catherine Barton

The account of the story in *Chamb. Book of Days*, Vol. II., p. 757, distinctly discredits it.

In conclusion we point out that Voltaire was born in 1694 and died in 1778; hence he was *not born* till 29 years *after* the "event," and the anecdote was not published by him (in *Elémens de Philosophie de Newton*, 3me partie, Chap. III., till 1738, that is 73 years after the alleged incident is supposed to have taken place.

That the Primrose was Lord Beaconsfield's favourite Flower

F. E. Hulme (*Familiar Wild Flowers*) mentions that the flower was a favourite with the poets Shakespeare, Milton, Cowper, Burns, Goldsmith, Beaumont, and Fletcher, but he does not mention the Prince Consort Albert, nor Lord Beaconsfield. One account is that Queen Victoria on one occasion sent some primroses to Lord Beaconsfield with the remark, "his favourite flower," referring to her late husband, Prince Albert.

The *Harms. Ency.*, under Primrose League, refers to primroses and says, "said to have been the earl's favourite flower."

Lady Dorothy Nevill says (*The Reminiscences of Lady Dorothy Nevill*, p. 210):—

"The primrose is now generally supposed to have been Lord Beaconsfield's favourite flower, but I cannot say for certain that I ever heard him express any particular partiality for it, though I dare say he may have done so. As a matter of fact, I believe that Queen Victoria at the proper season invariably sent Lord Beaconsfield primroses from the slopes at Windsor, and it is probable that, having expressed to someone his warm appreciation of these flowers, it was in consequence assumed that the great statesman had a strong partiality for the primrose. I sat next Mr. Gladstone at a dinner some time after Lord Beaconsfield's death, and in the course of conversation he suddenly said: 'Tell me, Lady Dorothy, upon your honour, have you ever heard Lord Beaconsfield express any particular fondness for the primrose?' I was compelled to admit that I had not, upon which he said: 'The gorgeous lily, I think, was more to his taste.'"

"The woods are denuded of primroses to commemorate the statesman who recommended them as a salad!"—*Daily Chronicle*, April 20, 1910.

That Sir Humphry Davy was the First and Sole Inventor of the Miner's Safety Lamp.

Dr. Samuel Smiles devotes a chapter (pp. 89—108) of his *Life of George Stephenson* to this subject to which the reader is referred for full details. The following are quotations from the work named :—

p. 92, " Something had already been attempted towards the invention of such a lamp by Dr. Clanny, of Sunderland, who in 1813 contrived an apparatus to which he gave air from the mine through water, by means of bellows. . . . Sir Humphry Davy accordingly visited the collieries near Newcastle on Aug. 24, 1815 ; and on Nov. 9 following, he read before the Royal Soc. of London his celebrated paper ' On the Fire-Damp of Coal Mines, and on methods of lighting the Mines so as to prevent its explosion.' But a humbler though not less diligent and original thinker had been at work before him, and had already practically solved the problem of the Safety-Lamp . . . . In the month of Aug., 1815, he [Stephenson] requested his friend Nicholas Wood, the head viewer, to prepare a drawing of a lamp according to the description which he gave him." The lamp was received from the makers on Oct. 21, 1815, and was tested in the Killingworth mine on the same day by Stephenson, in the presence of Nicholas Wood and Moodie. It proved satisfactory, but naturally Stephenson saw how to improve it, so that on Nov. 30, 1815, we find him testing his *third* lamp in the Killingworth pit. " At that time," writes Dr. Smiles, " neither Stephenson nor Wood had heard of Sir Humphry Davy's experiments nor of the lamp which that gentleman proposed to construct . . . . It is perfectly clear, however, that Stephenson had ascertained *the fact* that flame will not pass through tubes of a certain diameter—the principle on which the safety-lamp is constructed—before Sir Humphry Davy had formed any definite idea on the subject, or invented the model lamp afterwards exhibited by him before the Roy. Soc. . . . . The *first* was tried on Oct. 21, 1815, the *second* was tried on Nov. 4 ; but it was not until Nov. 9 that Sir Humphry Davy presented his first lamp to the public. And by the 30th of the same month Stephenson had constructed and tested his *third* safety-lamp. . . . . At the same time, there is no doubt that it was to Sir Humphry Davy that the merit belonged of having pointed out the true law on which the safety-lamp is constructed . . .

and although Stephenson's lamp was, unquestionably, the first successful lamp that had been constructed on such principle, and proved to be efficient, yet Sir Humphry Davy did invent a safety-lamp, no doubt quite independent of all that Stephenson had done."

Dr. Smiles points out that while at the time Stephenson was but a colliery engine-wright "Scarce raised above the manual-labour class," Sir Humphry was at the zenith of his reputation, hence the liability of Stephenson's claims to be overshadowed.

Both lamps (the 'Geordy' and the 'Davy') were taken up and used on a commercial scale, and Smiles gives an account of an accident in the Oaks pit at Barnsley on Aug. 20, 1857, in which the Geordy proved to be the safer lamp.

The *Book of Days*, Vol I., p. 85, gives an interesting account of the invention and states that Stephenson's lamp was first tested in a coal mine (Killingworth) on Oct. 21, 1815, while Davy's was similarly tested (in the Hebburn pit) on Jan. 9, 1816. Stephenson took his lamp into the mine himself, but Davy's lamp was taken down by the Rev. John Hodgson, rector of Jarrow. "No one can *now* doubt that both Davy and Stephenson really invented the safety lamp, quite independently of each other."

"He made numerous experiments on the combustion of the escaping inflammable gases at Killingworth colliery, and eventually designed a safety lamp, by controlling the entry of the air to support combustion, and the escape of the products of combustion by the use of small tubes for the gases to pass through. On 21 Oct., 1815, the first lamp was actually tried, on 4 Nov. a second improved form, and on 30 Nov. a third still better were tested. On this last occasion he entered with his lamp with perfect safety into parts of the workings which were full of gas. Sir Humphry Davy had, unknown to Stephenson, been working on the same subject, and practically at the same time that Stephenson's long experiments bore fruit in his lamp, Davy brought out his well-known [gauze] safety lamp. A fierce controversy raged for several years on the question to whom was due the credit of this solution of a problem fraught with life and death to so many thousands of miners. A national testimonial to Davy produced a testimonial to Stephenson, and he was presented with £1,000 and an address. There can be little doubt that the two inventions were quite independent of each other, and that both men

practically reached the same solution by different methods at the same time."—Prof. T. Hudson Beare, B.Sc., M.I.C.E.

That George Washington was born on February 22nd [1732]

His birthday is 'kept' in the United States on Feb 22 of each year, but he was born on Feb 11, 1732, the date since being altered by the elimination of eleven days when the Old Style Calendar was corrected to the New.

That Galvani's celebrated Electric Experiment with a Frog's legs was the result of an accident with a Scalpel

"Galvani, Luigi, Anatomist, b. Bologna, Sept. 9, 1737; d. 1798. The story of the convulsive muscular movements produced in a skinned frog by a chance contact with a scalpel may be dismissed as unfounded; there is evidence that Galvani's views were based on experiments patiently conducted for many years before the publication of his *De viribus Electricitatis in Motu Musculari Commentarius* (1791)." —*Cham. Ency.* Dr. Brewer (*Phrase and Fables*, p. 498) gives the popular story. "His investigations of the contractions produced in the muscles of frogs by contact with metals were the commencement of the discovery of galvanic or voltaic electricity."—*Cyclo. Names.* The story was given by the biographer of Galvani in *Rees's Cyclopædia.* The account given in Deschanel's *Nat. Philos.*, Vol. III., p. 645, differs somewhat from the usual story, though it rather supports the opinion that the discovery was accidental.

Ency. Brit., X., 48, also refutes the popular story, but gives as the origin the hanging of some frogs "on an iron railing by copper hooks caused twitchings in the muscles of their legs, led him to the invention of his metallic arc."

John Phin, p. 181, *The Seven Follies of Science*, "The story about Madame Galvani and her frog soup, as given in popular books on electricity and in many old text-books, is a fabrication of Alibert, an Italian writer of no repute. It is completely disproved by the fact that at the time his wife's health failed Galvani had been engaged for eleven years in a series of experiments in which he had used frogs' legs as electroscopes."

That Mademoiselle de Maupin was not a real person, but only a Character in Fiction

"The majority of readers who have enjoyed Théophile Gautier's fascinating romance 'Mademoiselle de Maupin'

are probably unaware that the heroine was a real person. The Mademoiselle de Maupin of real life was a singer at the Opéra, in Paris, at the end of the seventeenth century. She was the daughter of a man of somewhat humble extraction, engaged in secretarial work with the Count d'Armagnac; and whilst only a girl married a man named Maupin, employed in the province. With him she had lived but a few months when she ran away with a French fencing master named Serane, under whose tuition she became an excellent swordswoman. Her first serious escapade occurred during a professional tour from Paris to Marseilles, in which she as an actress took the part of a man. She gained the affections of the hair-brained daughter of a rich Marseilles merchant, and, as a man, ran away with her. Being pursued, they took refuge in a convent, to escape from which she set the building on fire, and took the girl with her by force. The girl, however, eventually escaped from her deceiver, and returned to her parents. La Maupin was afterwards captured, but succeeded in avoiding punishment. The exploits of Maupin alone would fill a book, but space does not permit of more than one other anecdote concerning her. She went, attired as a man, to a ball given by a prince of the blood. In that garb, apparently with the deliberate intention of provoking a quarrel, she insulted a fellow-guest, a woman, and was challenged by three different men, each of whom, when the consequent fight came on, she ran through the body, after which she returned to the ball."—*T.P's Weekly*, Jan. 27, 1911.

That Dunlop was the Originator of Pneumatic Tyres

W. R. Thompson was the inventor. Dr. H. S. Hele Shaw, LL.D., F.R.S., when delivering the Friday evening discourse at the Royal Institution on Mar. 31, 1911, said: "Thompson drove in Hyde Park in 1846 in a carriage having pneumatic tyres of his own inventing." Thompson took out a patent for his tyres in 1848. Mr. J. B. Dunlop began his work on pneumatic tyres in 1888. It is true that the Dunlop tyre has been a great commercial success, while the Thompson tyre may not have been, but this does not alter the fact that it is to Thompson's originality we owe the pneumatic tyre. It must be remembered that in 1846 bicycles were practically unknown compared with the numbers in use in 1890, so there were not the opportunities

for the Thompson tyre that there were for the Dunlop one. In fact Thompson was before his time as has happened in the case of many another inventor. A similar case is that of the gear in connection with the front wheels of motor-cars, whereby each wheel turns about a separate centre to enable the car to turn. This gear was invented in 1818 by Rudolph Ackermann (the author's great grandfather), and is still known by his name, but it was never used to any appreciable extent till some 80 years later when it proved to be an almost absolute necessity for motor vehicles.

In conclusion we reprint two letters that appeared in the *Daily Mail* of Nov. 29, 1909, and June 16, 1910, respectively. That by Mr. J. B. Dunlop himself is conclusive. We have omitted the last three paragraphs of Mr. Dunlop's letter.

"Sir,—I read the account of the coming-of-age of the pneumatic tyre in *The Daily Mail*. May I say that W. R. Thompson was the inventor and patentee of the pneumatic tyre sixty-three years ago—not twenty-one? These tyres were fitted to carriages and running about London with every satisfaction.

"Some of your readers may remember seeing some of his large traction engines at the Royal Show at Wolverhampton in 1871. These had solid tyres 12in. wide and 5in. thick. Thompson was the pioneer of rubber tyres for use upon high roads. JAMES WATT BOULTON.

"Cheadle, Manchester."

"Sir,—My attention has been called to an article entitled 'Who Invented the Pneumatic Tyre?' appearing in *The Daily Mail*, signed 'H.'

"Legally, I am not the first and true inventor. Practically I am the first and real inventor of the 'pneumatic tyre,' so named by me. With the valued assistance of Messrs. Edlin and Sinclair, I placed the tyre on the market and founded a vast industry. The pioneer work was done in Belfast in 1888 and 1889.

"When Mr. Edlin saw and tried a Quadrant tricycle in July, 1888, the driving-wheels of which I built and fitted with pneumatic tyres, he said, 'What a splendid thing, if it only wears.' He subsequently built a bicycle for me to the wheels of which I fitted pneumatic tyres. This bicycle was ridden upwards of 3,000 miles, and the tyres, with the

exception of thin linen wrapped round the rim, were not improved on for three or four years afterwards.

"If these tyres had been ridden, say, three or four miles, and then cast aside for forty years or so, I should be very loath to claim to be the real inventor. If such had been the case my invention would not have been a benefit to mankind, but, on the contrary, the knowledge of my experience would only have tended to hinder others (if any) whose minds might happen to run on similar lines.

"My son did not complain of the jolting, referred to in your columns, until I told him I could make the fastest bicycle ever made. I would have invented the pneumatic tyre if my son had never been born, but the event would not, I dare say, have taken place so soon.

"J. B. DUNLOP.

"Ailesbury Road, Dublin."

That Sir Walter Raleigh introduced Tobacco into England

The introduction of tobacco into England was due either to Sir John Hawkins (in 1565), or to Sir Francis Drake and Ralph Lane, first Governor of Virginia, jointly in 1586.

Sir John Hawkins sailed to Florida in 1565 and in his diary, which was published in 1589, he *described* the smoking of the Floridians.

Chamb. Ency., X., p. 228, gives the credit to Sir John Hawkins in the following paragraph:—"Into England tobacco was first brought by Sir John Hawkins in 1565. Probably Sir Walter Raleigh had much to do with its popularity by encouraging its growth in Ireland in 1586, but he was not the introducer; we read in Lobel's *Stirpium Adversaria Nova* (London, 1571) that tobacco was at that time successfully cultivated in England and Scotland."

This seems definite and convincing, and we may note that as Sir Walter Raleigh was born in 1552, he was only 13 when Sir John Hawkins is said to have introduced tobacco.

The tobacco *plant* was first brought to Europe by Francisco Fernandes, a Spanish physician, in 1558, who introduced it into Spain, and it is interesting to note the violent opposition to its use which occurred in practically the whole of Europe. For example, in Switzerland its prohibition was even included among the 'Ten' Commandments!

In *Ency. Brit.*, XIX., iii., we read: "The introduction of the tobacco pipe into Europe is generally ascribed to Ralph Lane, first governor of Virginia, who in 1586 brought an Indian pipe to Sir Walter Raleigh and taught that courtier how to use the implement." While at p. 423 of Vol. XXIII., "the plant came to Europe through Spain, the habit of smoking it was initiated and spread through English example. Ralph Lane and Sir Francis Drake brought with them in 1586 the implements and materials of tobacco smoking, which they handed over to Sir Walter Raleigh." In the *Harms. Ency.*, "It is said that Sir John Hawkins first introduced tobacco into England, direct from America, in 1565; but the British are more indebted to Sir Walter Raleigh and Sir Francis Drake for popularising the habit about the year 1586, and there is no doubt Sir Walter cultivated the plant in Ireland in 1586 and following years."

"Tobacco was introduced from San Domingo into Spain and Portugal in 1559, and thence brought, the same year, to France by Jean Nicot (whence sprang the term 'Nicotine'); . . . ."—N. W. Hill in *Notes and Queries*, May 26, 1923. Hence, whatever doubt there may be as between Hawkins and Drake, it is certain that Raleigh was not the original introducer.

That Sir Walter Raleigh laid his Cloak on the ground for Queen Elizabeth to step on

This tradition is kept alive by Sir Walter Scott in *Kenilworth*, Chap. XV.:—

"Hark ye, Master Raleigh, see thou fail not to wear thy muddy cloak, in token of penitence, till our pleasure 'be further known.'"

But in *Cham. Ency.*, Vol. VIII., p. 568, we read, "Fuller's well-known story of how he first caught her eye by flinging down on the ground his fine plush cloak, to save her feet from the mire, is most likely completely apocryphal, but well befits the romantic temper of the times and the manner of fantastic devotion with which the Virgin Queen loved to be wooed or worshipped by the fine gentlemen of her Court."

That Darwin was an Atheist

A few quotations from Darwin's *Naturalist's Voyage Round the World* should completely convince the most sceptical that

it is an utter libel to call Darwin an atheist. The quotations are made from the edition published by John Murray in 1897.

p. 251, "They asked me, 'Why do you not become a Christian—for our religion is certain?' I assured them I was a sort of Christian; . . . " p. 271, "Thank God, we are not destined here to see the end of it, but hope then to be in the Pacific Ocean, where a blue sky tells one there is a heaven—a something beyond the clouds above our heads." p. 277, "When finding, as in this case, animals which seem to play so insignificant a part in the great scheme of nature, one is apt to wonder why they were created." p. 394, "Before we laid ourselves down to sleep, the elder Tahitian fell on his knees, and with closed eyes repeated a long prayer in his native tongue. He prayed as a Christian should do, with fitting reverence, and without the fear of ridicule or any ostentation of piety. At our meals neither of the men would taste food without saying beforehand a short grace. Those travellers who think that a Tahitian prays only when the eyes of the missionary are fixed on him, should have slept with us that night on the mountain-side." p. 397, "They expect the missionaries to effect that which the Apostles themselves failed to do. They forget that . . . . have been abolished; and that dishonesty, intemperance and licentiousness have been greatly reduced by the introduction of Christianity. In a voyager to forget these things is base ingratitude; for should he chance to be at the point of shipwreck on some unknown coast, he will most devoutly pray that the lesson of the missionary may have extended thus far. . . . I believe that, disappointed in not finding the field of licentiousness quite so open as formerly, they will not give credit to a morality which they do not wish to practise or to a religion which they undervalue, if not despise." p. 408, ". . . . the lesson of the missionary is the enchanter's wand." p. 411, "Christmas Day. . . . . this is the fifth here; and the next, I trust in Providence, will be in England. We attended divine service in the Chapel of Pahia;" p. 413, "I look back but to one bright spot, and that is Waimate, with its Christian inhabitants." p. 478, "On the 19th of August we finally left the shores of Brazil. I thank God, I shall never again visit a slave country." And then he goes on to describe some of the ghastly horrors of slavery. p. 482, "Both are temples filled with the varied productions of the God of Nature:—

No one can stand in these solitudes unmoved, and not feel that there is more in man than the mere breath of his body." While at p. 194 of his *Descent of Man* (1901), we find, " The ennobling belief in God is not universal with man ; and the belief in spiritual agencies naturally follows from other mental powers."

That the Quantitative Law of Refraction was discovered by Descartes

The principle here involved seems to be the same as that by which most good stories used to be ascribed to Sydney Smith ! To Descartes so much is rightly due, that even the work of other scientists is assigned to him. It was Willebrord Snell van Roijen (known briefly as Snell), a Dutch geometrician (1591-1626) who discovered the law of refraction, in 1621, though Descartes made it more widely known, and hence the error in thinking that the latter was the discoverer, as is pointed out in Deschanel's *Natural Philosophy*, Vol. IV., p. 993. Dr. W. Watson, *A Text Book of Physics*, p. 468, refers to Snell's Law of Refraction.

Miss Elizabeth S. Haldane (*Descartes, his Life and Times*, 1905, p. 153) writes, " At this [1632] period the refraction of sound and light was concerning him greatly, and, curiously enough, he did not appear to have known what had been done by others, and more especially by Snell in connection with the latter." A reference is then given to the *Correspondence* of Descartes, Vol. I., p. 257.

That Cleopatra's Needles were made by, or in honour of, Cleopatra

Cleopatra was a daughter of Ptolemy Auletes, King of Egypt, who died 51 B.C., and directed that she and her elder brother, Ptolemy, should reign jointly, but as injustice to women was known even in those days she was somehow ousted from the throne, until she fascinated Cæsar (in 48 B.C.), he being then 52 and she 20, who made her Queen of Egypt jointly with her younger brother, also named Ptolemy. Now the two red granite obelisks, misleadingly called Cleopatra's Needles, were brought (about 14 B.C.) from Heliopolis to Alexandria during the reign of the Roman Emperor Augustus and were set up before the temple of Cæsar. One of these was given to England by Muhammad Ali early in the 19th

century, and was brought to England in 1877, after an eventful voyage, at the expense of Sir Erasmus Wilson, the distinguished dermatologist, while the other was taken to New York a few years later, and erected in Central Park. The needle in America is 1½ ft. less in height than the English one! The hieroglyphic inscriptions show that both were made during the reign of Thothmes III., about 1600 B.C., and that Rameses II., who lived about 250 years later, added to the inscriptions to record his titles of honour and greatness. How they ever came to be named after Cleopatra is not recorded.

That Chloroform was Discovered by Dr. Simpson

"I do know her spirit,
And will not trust one of her malice with
A drug of such damned nature. Those she has
Will stupefy and dull the sense a while:
Which first, perchance, she'll prove on cats and dogs,
Then afterwards up higher; but there is
No danger in what show of death it makes,
More than the locking up the spirits a time,
To be more fresh, reviving."

Cymbeline, I., v., 36-42

"O, 'tis pregnant, pregnant!
The drug he gave me, which he said was precious
And cordial to me, have I not found it
Murd'rous to the senses?"

Ibid, IV., ii., 324.

"I, dreading that her purpose
Was of more danger, did compound for her
A certain stuff, which, being ta'en, would cease
The present power of life, but in short time,
All offices of nature would again
Do their due functions."

Ibid, V., v., 252-7.

It was discovered by Soubeiran and Liebig in 1832, and was introduced as an anæsthetic by James Young Simpson, M.D., in 1847. Sir James is recorded as the *introducer* on the marble tablet to his memory in Westminster Abbey. Pye Chavasse, F.R.C.S., also speaks of Simpson as having introduced chloroform. So does the *Harms. Ency.* and the *Cyclo. Names.*

It is of interest to note that Boccaccio in his *Decameron* (tenth story on the fourth day) apparently anticipated chloroform, for he tells us that Montagna, "a leech most eminent in surgery . . . . distilled in the morning a certain water of his own concoction, whereby the patient, drinking it, might be ensured sleep during such time as he

deemed the operation, which he meant to perform about vespers, would occupy." The bottle containing the fluid was left about and someone " taking it to be drinking water, set it to his lips and drank it all, and in no long time fell into a deep sleep." The fluid was evidently colourless like water, and, therefore, also like chloroform in appearance, but it was to be drunk, whereas chloroform is inhaled. Boccaccio was born in 1313 and died in 1375, so the anticipation was thorough as regards time !

That Leonardo da Vinci died in the arms of King Francis I. of France

The *Cyclopedia of Names*, though giving a comparatively long account of him, does not mention the popular story, merely stating that " He went to France in 1516, at the invitation of Francis I., and died there at the Château de Cloux." *Cham. Ency.* states, " The well-known story that he died in the royal arms is untrue." While in *Ency. Brit.*, 11th ed., Vol. XVI., p. 452, we find, " King Francis, then at the Court of St. Germain en Laye, is said to have wept for the loss of such a servant. That he was present beside the death-bed and held the dying painter in his arms is a familiar but untrue tale." Vasari (1511—1574) gives the story, but Maurice W. Brockwell in his *Leonardo da Vinci* (*Masterpieces in Colour* series), pp. 72-3, says, " The not over veracious chronicler [Vasari], however, is here drawing largely upon his imagination. Leonardo was only 67 years of age and the King was in all probability on that day at St. Germain-en Laye ! "

That Sir John Moore died on the Battlefield

" Slowly and sadly we laid him down,
From the field of his fame fresh and gory,
We carved not a line, and we raised not a stone,
But we left him alone, with his glory ! "
" The Burial of Sir John Moore."—Wolfe.

In *A Corner of Spain*, by Walter Wood, we read (p. 191), " Moore went to Corunna and took up lodgings in a little house facing the bay, ... (p. 192) some soldiers took him up and put him, conscious still, into a blanket, and bore him from the field of battle to his lodgings, ... He lingered a few hours at his lodgings, and just before he passed away he murmured : ' I hope the people of England will be satisfied. I hope my country will do me justice.' "

"Sir John Moore was wounded on the battlefield and died at his quarters in Corunna (1809). Moore, who had just been applauding a gallant charge of the 50th under Majors Charles James Napier and Stanhope, was close to the 42nd Highlanders when a grape-shot struck him from his horse shattering his left shoulder. A staff officer, Henry Hardinge, afterwards Lord Hardinge, went to his assistance, and a sergeant and two men of the 42nd carried him in a blanket to his quarters in the town, where he was laid on a mattress. He died that evening."—*Dic. of National Biography*, Vol. XXXVIII., p. 370.

That Vasco da Gama was the First Man to round the Cape of Good Hope

Neco, King of Egypt and son of Psamatik I., sent (about 615 B.C.) some Phœnician mariners from a port on the Red Sea right round Africa, the journey taking them 3 years, as the following extract from p. 356 of the 11th edition of *Egypt*, by Prof. G. Rawlinson, shows :—

"Neco determined to try whether Africa was not circumnavigable. Manning some ships with Phœnician mariners, as the boldest and most experienced, accustomed to brave the terrors of the Atlantic outside the Pillars of Hercules, he dispatched them from a port on the Red Sea, with orders to sail southwards, keeping the coast of Africa on their right, and see if they could not return to Egypt by way of the Mediterranean. The enterprise succeeded. The ships under the skilful guidance of the Phœnicians, anticipated the feat of Vasco da Gama—rounded the Cape of Storms, and returned by way of the Atlantic, the Straits of Gibraltar, and the Mediterranean to the land from which they had set out. But they did not reach Egypt *till the third year*." This fact is also recorded by H. Clive Barnard, M.A., B. Litt., at pp. 8 and 22 of his *Pictures of Famous Travel* (1913).

That Archimedes destroyed the Fleet of Marcellus at Syracuse in 212 B.C. by means of Mirrors reflecting the Sun's rays.

Plutarch in his *Lives* (*sub* "Marcellus") gives a vivid account of the work of the engines of Archimedes at the siege of Syracuse, but there is not a word about the utilization of mirrors or the Sun, and the *Cyclopedia of Names* says, "By means of military engines which he invented he postponed the fall of Syracuse when besieged by Marcellus, 214-

212 B.C., whose fleet he is incorrectly said to have destroyed by mirrors reflecting the Sun's rays." According to William Adams (*Solar Heat*) there was a raging controversy in the 18th century about the matter, and Buffon, the eminent French naturalist, to prove that it was physically possible, set light to a plank of wood on April 10, 1747, by reflecting the Sun's rays on to it by means of silvered glass mirrors at a distance of 150 feet.

The article on "Fortification and Siegecraft" in *Ency. Brit.*, 11th ed., mentions that Archimedes constructed missile engines which could throw a stone weighing 1,800 lb.—not bad for 212 B.C., seeing that H.M.S. *Queen Elizabeth* now (Mar., 1915) operating in the Dardanelles is using projectiles only 450 lb. heavier! The range of these stone missiles varied according to the machine (and inversely to the weight thrown) up to 600 yards. There is no mention of burning the fleet by any means.

In *Ency. Brit.* under Archimedes we find, "There is a story that he constructed a burning mirror which set the Roman ships on fire when they were within bow-shot of the wall. This has been discredited because it is not mentioned by Polybius, Livy, or Plutarch; but it is probable that Archimedes had constructed some such burning instrument, though the connection of it with the destruction of the Roman fleet is more than doubtful."

Sir Thomas Browne in Book VII., Chap. XVIII., § 3, of his *Vulgar Errors* discredits the story.

That Matthew Arnold formed one of a Dinner Party of 12 who dined with Sir John E. Millais (making 13 in all) in August, 1885, and that he died 6 months after

Harms. Ency. and the *Cyclo. of Names* state that Matthew Arnold died suddenly in Liverpool on April 15, 1888, and do not mention the dinner party. Mr. C. Nicholson tells me Arnold's death was due to heart failure, after jumping over a fence when out near Liverpool with his sister.

An article in *T.P.'s Weekly*, Mar. 20, 1908, gave the usual story, and then continued:—

"That is the famous story, and now a correspondent of the *Spectator* ruthlessly annihilates it by a cold examination of the alleged facts:—

"'The facts! The party is said to have taken place in August, 1885. Accordingly Arnold must have died in March.

1886, and the *Quetta* must have gone down about the same time. Eveyone knows that Matthew Arnold died in April, 1888, and I have just come across a reference to the wreck of the *Quetta* by one who lost several relatives in that ill-fated vessel, which gives the year of the wreck as 1890. What could a serious biographer have been about when he allowed his memory to trick him into penning such a piece of circumstantial nonsense? In view of these glaring discrepancies, it is allowable to discredit the whole story, however it may have formed itself in the writer's mind. Arnold knew from about 1868 that his life was precarious, and that his end was likely to be very sudden. Is it likely that even in jest he ever uttered such a speech as is here put into his mouth?"

The following matter on the number 13 is so interesting and amusing that it is quoted:—

"Sir,—For those who believe in the unlucky number it is rather a suggestive fact that it is linked up with the Insurance Act in every direction.

"In the first place, we find 13 different health stamps issued; the stamp card containing 13 spaces; the Liberal Insurance Committee fixed July 13 as the day for special rejoicing over the inauguration of the Act; the sick benefit ceases if a contributor is 13 weeks in arrears; the famous 9d. for 4d. when totalled gives us 13d.; and last of all, the benefits (?) will commence in the year 1913.—George W. Daw, Conservative Agent, Wandsworth, S.W."—*Daily Mail*, June 26, 1912.

Lady Hamilton, speaking at Queen's College, Harley Street, London, on Sept. 20, 1912, said, "The only time I ever encountered the superstition respecting thirteen was when going to Tasmania. We sailed on a Friday, the 13th, we sat down 13 to dinner every night on board ship, and I know that something else very ominous was associated with the trip—but nobody died."

Dr. Brewer (*Dic. of Phrase and Fable*) states that the Turks so dislike the number that the word is almost expunged from their vocabulary. This seems strong evidence in support of Dr. Brewer's further statement that "the superstition is much anterior to Christianity," and, therefore, its origin is not, as is commonly supposed, the fact that there were 13 present at the Last Supper. If it had this Christian origin it is unlikely that the Turks (Mohammedans) would have

taken any notice of it. Dr. Brewer also says that the Italians never use it in making up the numbers of their lotteries. In Paris no house bears the number and persons called Quartorziennes are reserved to make a 14th at dinner parties.

There are many hotels which do not number any room 13, and it is said that in Germany there are 500 hotels which omit this number, while in Berlin the number is not used in new streets. In Paris, Berne and elsewhere 11A, or 11½ is used instead of 13.

Thirteen is said to have been Richard Wagner's favourite number, for the following reasons :—There are 13 letters in his name (*i.e.*, if we forget that he had another Christian name—Wilhelm—which preceded Richard !) ; he was born in 1813 and he died on Feb. 13, 1883 ; he composed 13 operas. *Tannhäuser* was finished on Mar. 13 ; and he left Bayreuth on Sept. 13. The pontificate of Leo XIII. was one of the longest and greatest in the history of the Roman Church. There is no No. 13 in the Strand, Holborn, Threadneedle St., St. James's St., nor Westbourne Grove. There was certainly no No. 13 in Earl's Court Sq. in Nov., 1914, the house being marked 11A instead ! Apparently wealth is not incompatible with a house bearing this number, for the late Mr. Pierpont Morgan lived at No. 13, Prince's Gate, South Kensington.

Curiously enough, and somewhat inconsistently, the number is also used as a charm. *E.g.*, I saw " No. 13 " made of gold, and so worn by Miss MacLennan at Leiria, Portugal, on Feb. 20, 1913.

Quetelet (*Theory of Probabilities*) states that, " There is a prejudice existing generally on the pretended danger of the thirteenth at table. If the probability be required that out of 13 persons of different ages one of them, at least, should die within a year, it will be found that the chances are about one to one that one death at least will occur. This calculation by means of a false interpretation has given rise to the prejudice, no less ridiculous, that the danger will be avoided by inviting a greater number of guests, which can only have the effect of augmenting the probability of the event so much apprehended." " The superstition of thirteen at table," says Mr. T. Sharper Knowlson (*The Origin of Popular Superstitions*, p. 169), " is one of the most pitiful exhibitions of mental weakness that has ever marked human thought." He quotes an amusing account of a dinner at the Thirteen Club in New York.

The Star of Feb. 6, 1919, reported that, "Lord Roberts found nothing to fear in 13. At Peshawar, on Jan. 1, 1853, he records he was one of a dinner party of 13. "Eleven years later the same company dined together again, all alive and well, though all had been through the Mutiny, and five or six had been wounded. "Some of them, like 'Bobs' himself, lived to be over eighty."

There is, of course, scarcely any limit to the number of illustrations of 13. Here is one in the form of a letter to the *Daily Mail* of Sept. 9, 1916:—

"Sir,—Kaiser Wilhelm was born in 1859, a multiple of 13 by 143, and 143 is a multiple of 13. 'Kaiser Wilhelm' counts 13 letters, likewise his dupes—

Francis Joseph,
Czar Ferdinand, and
Sultan Mehmed V.

and his heroes—

von Hindenburg,
von Falkenhayn, and
Count Zeppelin;

and we must not forget the latter's 13 bags of 'frightfulness' in the last raid.—C.H.E., Leytonstone, N.E."

As this seemed to imply that the number 13 was associated only with things infamous, the author replied as follows, but his letter was not published, once again illustrating how the tendency is to prefer to perpetuate superstitions rather than to run them to earth:—

"Leytonstone, N.E.
Silly lunatics.
England Victor.
Lord Kitchener.
General Joffre.
General French.
Ad. Jno. Jellicoe.
Admiral Beatty.
Wil. Robinson, V.C."

Whether "C.H.E." realised that his own address contained 13 letters is not apparent.

That Gladstone originated the Phrase "Three Acres and a Cow"

It was Pitt who introduced a Three-Acres-and-a-Cow Bill into the House of Commons, but it was lost, owing to

Bentham's satire. On Jan. 26, 1886, Mr. Jesse Collings moved an amendment, which got the popular name "Three-Acres-and-a-Cow" attached to it. Thus Mr. Jesse Collings indirectly revived the phrase which has become so attached to his name that, in 1912, when the freedom of the City of Birmingham was conferred on him, the casket containing the scroll, and designed by Mr. A. J. Gaskin, was adorned on the lid by a cow and milkmaid, and groups of three dots; these were to represent the three acres.

That King Ludwig of Bavaria built Bayreuth Theatre

The matter was dealt with in *T.P.'s Weekly* of Mar. 23, 1913, in the following words:—

"The approaching Centenary of Wagner's birth already is marked by the repetition of errors concerning the life and work of the great dramatic composer. The chief of these, repeated with amazing frequency, is to the effect that King Ludwig of Bavaria, familiarly known as the Mad King, built Bayreuth Theatre. This statement is repeated with great joy by the anti-Wagnerian as an example of Wagner's dependence upon a madman. The Wagnerian, however, cites it as an example of noble patronage.

"The truth is that Ludwig did not provide the money to build Wagner a theatre. Wagner himself provided much; the Burgomaster and citizens of Bayreuth helped; Wagner Societies sent contributions; and King Ludwig provided a 'loan.' The Wagner Theatre was built out of the contributions of numerous admirers, from the Khedive of Egypt to a few poor students of Gottingen, who were among the first to respond to an appeal."

That Dr. Samuel Johnson used to frequent "The Cheshire Cheese" Tavern, off Fleet Street

The most significant fact is that Boswell does not mention the "Cheshire Cheese" in his renowned *Life of Johnson*, and seeing that he does refer frequently to other taverns by name, to wit "The Mitre," "The Globe," and "The Turks' Head," and remembering the immense amount of detail given in his work, it is almost conclusive that Johnson was not a visitor to the "Cheshire Cheese."

In a pamphlet (*Coronation Souvenir*) issued by the Inn in 1911, a quotation is given from Sir Walter Besant's *Fifty Years Ago* in which he says, ". . . . Dr. Johnson spent

the evenings of his last years at the tavern . . . . ." An article, *A Storied Tavern*, by Mr. Outram Tristam, which appeared in the *English Illustrated Magazine* of Dec., 1889, is also quoted in which it is said, " Johnson, Garrick, Goldsmith and Chatterton were undoubted frequenters." On Jan. 18, 1917, the late Dr. Percy Ames, LL.D., Secretary of the Royal Society of Literature, told the author that there is no mention of any inn named " Ye Cheshire Cheese " in literature of the period of Johnson, and that there is no mention of " Ye Cheshire Cheese " in the whole of Boswell's *Life of Johnson*. Dr. Ames, therefore, argued that if the " Cheshire Cheese " existed in Johnson's time, it must have been under some other name. The present proprietor claims that the inn was " re-built in 1667."

That Sir Robert Walpole said : " Every man has his price."

The following article appeared in *The Egyptian Mail*, of Cairo, on Aug. 3, 1913 :—

" ANOTHER FAMOUS SAYING DECLARED UNTRUE.

" A correspondent writes to the *Times*. In his summing up of the evidence in a recent case Mr. Justice Darling is reported to have said, ' An eminent statesman had said all people could be bought and that it was only a question of price.' Surely it is time that this long-established fiction was laid to rest. It is true that Horace Walpole, in a letter from Arlington Street to Mr. Cole (dated May 4, 1774), writes, ' My father is said to have said that every man had his price.' But against this there is the following passage in Lord Morley's *Life of Sir Robert Walpole* (Chap. vi., Characteristics) :—

" ' Walpole has no doubt suffered much in the opinion of posterity as the supposed author of the shallow and cynical apophthegm that every man has his price.' People who know nothing else about Walpole believe and repeat this about him. Yet the story is a pure piece of misrepresentation.

" He never delivered himself of that famous slander on mankind. One day, mocking the flowery and declamatory professions of some of the patriots in Opposition, he insisted on finding self-interest or family interest at the bottom of their fine things. ' All these men,' he said, ' have their price.' ' As to the revolters,' he told the King, ' I know the reasons and I know the price of every one of them.' Nor was he wrong, as time showed. It was not as a general but as a particular proposition that it was true. When an honest man came in his

way, Walpole knew him well enough. 'I will not say,' he observed, 'who is corrupt, but I will say who is not, and that is Shippen.' And yet 'Honest Shippen' was one of the stoutest of his opponents.'

"Lord Morley can, no doubt, satisfy any one who desires further information on the point, but the extract quoted above is sufficiently conclusive to prevent this "pure piece of misrepresentation" from gaining further credence."

Prof. Oman, p. 493, *A History of England*, "His [Sir Robert's] morals and his language were alike coarse; he affected a shameless cynicism, which is well reflected in the saying that 'every man has his price' which was put into his mouth by his enemies. This phrase, indeed, well expresses his political methods; his end was to maintain himself in office. . . ."

There is a good story connected with the Spanish American War. It is said that the Spaniards tried hard to bribe an American official at a port. He kept refusing their offered bribes, but one morning he received an offer several fold as large as the last. Then he wrote to his headquarters at Washington and asked to be relieved of his duties—"as the Spaniards here are getting very near to my price!"

That M. Alphonse Bertillion Invented the System of Identification by Finger Prints

There is an interesting and fairly long article on the subject in *Harms Ency.*, which points out that the use of finger prints dates from very early times, [We believe the Chinese use their thumbs as seals.] and states that Sir William Herschel, when in charge of the Hugli district, India, introduced the practice. Mr. (now Sir) Edward R. Henry amplified the system of classification proposed by Prof. Purkenje in 1823. Sir Francis Galton, F.R.S., did a great deal of work at the subject. On June 12, 1897, the system was adopted generally throughout India, and in July, 1901, it was adopted by the police of England and Wales, replacing the system of anthropometric measurements which were originally introduced by M. Bertillon and used by the French police. In 1900 there were 462 identifications in England by the Bertillon system. In 1904 there were 5,155 by the finger-print system. By the end of 1905 the police had finger-print records of 80,000 persons, and these are being added to at the rate of 350 per week.

On the death of M. Bertillon, *Nature* of Feb. 19, 1914, had a notice about him from which the following is extracted, " It is popularly supposed that M. Bertillon invented the system of identification by finger-prints, but this is an error. Dr. Henry Faulds, in *Nature* of Oct. 28, 1880, indicated how finger-prints might be applied to ethnological classification ; and his was the first printed communication on the subject, though public and official use of finger-prints had been made by Sir William Herschel in India some years before. M. Bertillon added the finger-print method to his own about 1891, after its advantages had been urged by Sir Francis Galton."

Vide pp. 250-8, *Memories of My Life*, Sir Francis Galton, F.R.S.

That Bold Robin Hood was a real person

He seems to be an imaginary person having pretty well defined characteristics making him a suitable " father " for many episodes, probably equally fictitious, of a freebooter though chivalrous nature. His best and most complete portrait is that painted by Sir Walter Scott in *Ivanhoe* where he appears under the name of Locksley. His period is variously given as the 12th, 13th or 14th century. Dr. E. A. Baker, D. Litt., goes further and says (*T.P.'s Weekly*, April 11, 1913). " . . . . . the elusive Robin Hood whose date is varied at the story-teller's convenience from the reign of John to that of Henry VIII." Fuller, in his *Worthies*, considers him an historical character, but Thierry says he simply represents a class as we have indicated above. Brewer says, " He was an immense favourite with the common people, who dubbed him an earl " : this is significant, and interesting in these democratic days ! Brewer did not commit himself as to whether he considered Robin Hood a fictitious character or not, but the *Cyclo. of Names* speaks of him as ' legendary.' Chamb. *Book of Days*, II., 606, which devotes a good deal of space to him, states that some accounts connect him with the reign of Henry II. Chambers says that the earliest demonstrable allusion to Robin Hood in English literature occurs in William Langlands *Vision of Piers Plowman* (*c.* 1362) :—

" I kan not perfitly my paternoster as the prest it sayeth,
But I kan rymes of Robyn Hode and Randolf, Earl of Chester."

Hone's *Everyday Book*, under the date Dec. 24, gives some information.

Timbs, p. 355, *Notabilia*, " Fordun, the Scottish historian (14th century), first mentions Robin Hood, ' the famous brigand Robert Hode, with his accomplices, whom the common people are so fond of celebrating in their games and stage-plays ; and whose exploits, chanted by strolling ballad-singers, delight them above all things.' Upon these ballads, adapting themselves generation by generation to the changes of language, rests the only historical evidence of the individuality of Robin Hood, beyond this mention by Fordun." Mr. C. E. Clark devotes pp. 33-6 of his *More Mistakes We Make* (1901) to this subject and begins by saying, " No antiquary that respects his cloth will admit that he ever lived outside his ballad."

That the Black Prince adopted his motto (Ich Dien) and badge (three Ostrich Feathers) from John, the blind King of Bohemia

" Ich Dien, the motto of Edward the Black Prince, whose badge was a single ostrich feather, afterwards three ostrich feathers. The story that he adopted both motto and badge from John, the blind King of Bohemia, after the battle of Crécy, is not borne out by historical investigation."— *Chamb. Ency.*, Vol. VI., p. 64. " The story which connects this motto with the blind King of Bohemia is evidently a romance."— *Daily Mail*, April 25, 1911. Prof. Oman does not mention either the motto or the feathers. Prof. Cyril Ransome (*A Short Hist. of England*, p. 117) says, " . . . . and ever since the words ' Ich Dien ' (*I serve*)—said to have been the motto of the blind King of Bohemia . . . —have been the motto of the Princes of Wales." *Harms. Ency.* does not give their origin. The *Cent. Dic.* gives the popular origin.

" The popular tradition concerning the crest and motto of the Black Prince is unsupported by history, and the authenticity of this legend is doubted by those who have gone into the question. The crest of the blind King John of Bohemia was not a plume of ostrich feathers, but the wings of a vulture expanded (*Olivarius Vredius*), also German (*Ich Dien*) was not the language of the Bohemians. Dr. Meyrick says that the cognisance and the motto originally belonged to the House of Hainault, and that both were adopted by Edward III. and his family in compliment to Queen Philippa, who was a daughter

of the Count of Hainault, German being the language of the Court of Hainault."—Constance Russell, Swallowfield Park, Reading.—*Notes and Queries*, Sept. 18, 1920, p. 235.

" (Mr. A. R. Bayley and Mr. H. J. V. Clements also thanked for replies.) "

That Pontius Pilate drowned himself in the lake at the summit of Mont de Pilate, and that the mountain was named after him

" I must add one example more of the dying out of the old life in a word, and the birth of a new in its stead. Everyone who has visited Lucerne in Switzerland must remember the rugged mountain called ' Mont de Pilate,' or ' Pilate's mountain,' which stands opposite to him ; and if he has been among the few to climb it, will have been shown by his guide the lake at the summit in which Pontius Pilate, in his despair, drowned himself, with an assurance that from this the mountain obtained its name. Nothing of the kind. ' Mont de Pilate ' was originally ' Mons *Pileatus*,' ' the *hatted* hill ' ; the clouds, as one often sees, gathering round its summit, and forming the shape and appearance of a turban or hat. When in the Middle Ages this true derivation was forgotten or misunderstood, the other was invented and imposed. An instructive example this, let me observe by the way, of that which we cannot doubt has happened continually in far older legends : I mean that the name has suggested the legend, and not the legend supplied the name."—Archbishop Trench, p. 44, *The Study of Words*.

That Magellan or Drake discovered the Pacific Ocean

The Pacific Ocean was discovered by Vasco Nuñez Balboa on Sept. 25, 1513. On Sept. 29 he strode knee deep into its waters and solemnly claimed possession of it, and all its coasts in the name of the King and Queen of Spain. He first saw it from Culebra, about half-way across the Isthmus of Panama.

Magellan learned of Balboa's discovery, and this stimulated him to explore the Pacific, which he entered through Magellan Strait on Nov. 28, 1520. Sir Francis Drake, on the other hand, was the first *English* commander to see the Pacific, which he did in 1572 or 1573.

The foregoing particulars are abstracted from the *Cyclo. of Names; Facts and Fancies*, p. 370; and *Pictures of Famous Travel*, pp. 28 and 31, by H. Clive Barnard, M.A., B.Litt.

That Dick Whittington was only "thrice Lord Mayor of London," and that he was Knighted

He was Lord Mayor of London *four* times, viz., in 1397, 1398, 1406 and 1419, as may be seen by *Whitaker's Almanack*, under "London, Lord Mayor of."

Mrs. Roe (*Sketches from English History*, p. 185) states that he was four times mayor. The *Cyclo. of Names* and Haydn's *Dic. of Dates* both give only 3 dates, by omitting 1398, while *Harms. Ency.* omits both 1398 and 1419! But for all this we read in *Ency. Brit.*, 11th ed., Vol. XXVIII., p. 615, "He was mayor for a third term in 1406-7, and for a fourth in 1419-20. He died in 1423."

Walter G. Bell, p. 57, *The Great Fire of London*, ". . . he was never Sir Richard, despite the popular belief." "His Knighthood is as legendary as his burning the royal bonds," *Dic. Nat. Biog.* Vide *Aldermen of London*, I., pp. 255-60; II., pp. 43, 180, by A. B. Bevan. The last authority says, Whittington was never *Lord* Mayor of London! "Died in 1423. He is not styled Knight by John Carpenter, his executor, who compiled the 'Liber Albus,' nor by Gregory ('London Chronicle': Camden Society, 128). He is first accorded this title in a Black Letter Ballad of 1641, two hundred years after his death; and it has since been attributed to him by popular writers, like those quoted by your correspondent.—H. MAYNARD SMITH."—*Notes and Queries*, Jan. 27, 1923, p. 77. Vide *Notes and Queries*, May 26, 1923, p. 419, and June 2, 1923, p. 438.

That Dick Whittington was poor when young

Mrs. Roe speaks of him as rich. *Harms. Ency.*, Vol. X., p. 515, says he was born in 1358, and that "in 1380 (*i.e.*, when he was only 22) he was a substantial city mercer, and records exist of his having lent large sums of money to Richard II., Henry IV. and Henry V." "Dick Whittington, third son of Sir William Whittington, of Pauntley, in Gloucestershire, a Knight of good family. . . . He was a mercer by trade, and clearly entered on his commercial career, under favourable circumstances. He married Alice, daughter of

Sir Ivo Fitzwaryn, a Dorset Knight of considerable property. . . . Richard Whittington of history is thus very different from the Dick Whittington of popular legend, which makes him a poor orphan, employed as a scullion by the rich merchant Sir Hugh Fitzwarren. . . . The legend is not referred to by Stow, whose love for exposing fables would assuredly have prompted him to notice it if it had been well established when he wrote. The first reference to the story comes with the licensing in 1605 of a play, now lost, *The History of Richard Whittington, of his lowe byrth, his great fortune.* Thos. Keightley traced the cat story in Persian, Danish and Italian folklore at least as far back as the 13th century."—*Ency. Brit.*, 11th ed., Vol. XXVIII., p. 615.

Vide also the *Life of Whittington*, by Besant & Rice, 1894 ; and p. 36, *More Mistakes We Make*, C. E. Clark.

That Shakespeare, the Poet, sold Malt at Stratford, and got into Litigation about it with one of his Customers

" For half a century and more it has been believed that William Shakespeare, the poet, was also a dealer in malt, and that he sued a brewer for an over-due account. People were glad to believe that ; they would be glad to believe it still. We like, in truth, to think of our great Shakespeare turning an honest penny by selling honest stuff for the making of honest beer, and standing no nonsense from a brewer who would not pay. There is something English, homely, human about it, that brings the greatest poet of all time a little nearer to our humdrum hearts. And now comes Dr. Wallace, telling us that we must give up that link with the immortal. The maltster was not Shakespeare the poet at all, but another man of the same (or very nearly the same) name. Well, unless possibly Shakespeare the poet dealt in malt by deputy, it seems that Dr. Wallace is right. A man could not deal in malt and bring petty actions in Stratford-upon-Avon while he was doing all that high and mighty work among kings and queens in London. We must say good-bye to our Shakespeare's practical connection with good English beer—and that is particularly saddening at this present moment of time."—*The Times*, May 8, 1915.

At p. 6 of the same issue of *The Times* an article by Prof. C. W. Wallace is given in which he shows how he deduced that Shakespeare, the poet, and Shakespeare, the maltster, were not the same individual.

That Marconi invented Wireless Telegraphy

It was announced in the press of June 10, 1914, that the Council of the Royal Society of Arts had awarded the Albert Medal for that year to Mr. Marconi " for his services in the *development and practical application* of wireless telegraphy."

The Century Cyclopedia of Names says, " Marconi, Guglielmo. Born at Bologna, Italy, April 25, 1874. An Italian electrician, noted as the perfecter of a system of wireless telegraphy."

" The public likes to believe that men of science predicted from theory that this or that thing was impossible which was afterwards achieved ; and its literary guides usually associate a great discovery not with the man whose work in the laboratory or study led to it, but to the man who made a commercial success of it. It was the mathematical work of Clerk Maxwell and the scientific experiments of Hertz which produced wireless telegraphy, but to the popular press the only man responsible for this wonderful discovery is Mr. Marconi.

" Very soon after Hertz had described his remarkable researches on the production and detection of electro-magnetic waves, the scientific world realised their importance. It was pointed out that as Hertzian waves possess the property of passing through fog or material obstacles they could be used for a system of wireless telegraphy.

" The receiver used by Hertz was not suitable for telegraphic work, but a more practicable form was soon found, and was used in a lecture delivered by Sir Oliver Lodge before the Royal Institution in 1894, when the statement was made that the apparatus would respond to signals at a distance of half a mile. Two years later, Mr. Marconi filed a provisional specification of apparatus for signalling by means of electric waves.

" Mr. Marconi not only saw that the laboratory experiments of Hertz might be put to practical use, but also proceeded to adapt them to a system of telegraphy through the ether. To his knowledge, confidence and daring must be ascribed the commercial development of wireless telegraphy, but his achievements were direct consequences of the scientific work of Hertz, Maxwell, Faraday and Henry. As he himself acknowledged in 1900 :—

" ' The experimental proof of Hertz, thirteen years ago, of the identity of light and electricity, and the knowledge of how

to produce, and how to detect, these ether-waves, the existence of which had been so far unknown, made possible wireless telegraphy.' "—Sir Richard A. Gregory, D.Sc., p. 206 of *The Illuminating Engineer* for May, 1915.

" The presentation of the Albert medal of the Royal Society of Arts to Sir Oliver Lodge on June 6, ' in recognition of his work as the pioneer of wireless telegraphy,' has given much gratification to men of science. The developments of wireless telegraphy have been so remarkable that the early demonstrations of its practicability by Sir Oliver Lodge are likely to be forgotten except by the people who witnessed them. We are glad, therefore, that the Royal Society of Arts has by its award given public recognition of his pioneer work, and has distinguished itself by being the first to confer an honour so fully merited."—*Nature*, June 12, 1919, p. 289.

The following is an abridgment of a letter which appeared in *T.P.'s Weekly* of Aug. 12, 1910 :—

" Sir,—I notice in your issue of August 5 an article entitled ' The Marconi Labyrinth.' I do not, as a rule, take the trouble to correct the innumerable inaccuracies which are invariably introduced when radio-telegraphy is written about. In this case, however, the two other excellent scientific articles which appear in the same issue give to this one a value and accuracy that are fictitious.

" To begin with, Marconi certainly improved upon the work of earlier electricians, but the coherer, or first detector, was the invention of Prof. Branly, in 1893. It is not correct to say that without the coherer there could have been no wireless telegraphy. Many forms of wave detector were known, and the coherer was only one of them. Again, the magnetic detector was the work of Prof. Rutherford and Wilson, about five years prior to Marconi. But your correspondent errs more seriously when he talks about tuning.

" In the first place, the principles of tuning were well understood certainly nine years prior to Marconi's first tuning patent, and were practically applied to wireless telegraphy in 1897 by Sir Oliver Lodge, or three years prior to Marconi.

" The article finishes by stating that the British Navy is fitted with Marconi apparatus. The Admiralty have evolved their own system, and take certain apparatus from various wireless telegraph companies, ourselves among the number, and do not use the Marconi system. I am uncertain whether

the oft-recurring word ' Marconi ' is used as a general term for all wireless systems, or whether the article is an advertisement for the Marconi Company. In either case, I hope you will see your way to correcting at any rate some of the errors.
—Yours faithfully, T. VINCENT SMITH, Director,
" The British Radio Telegraph and Telephone Co., Ltd.,
" 5, London Wall Buildings, E.C."

A Belgian friend wrote to the author on June 7, 1915, to say he had consulted *Larousse's Dictionary*, and found: " Branly (Edouard), French physician, born in Amiens, 1846. Founder of the ' radio conducteur or cohéreur ' which has enabled wireless telegraphy to be used practically."

The *Harms. Ency.* does not speak of Marconi as the inventor, but on the contrary, under " Hertz " will be found the following: " It was during his tenure of professorship in Karlsruhe technical high school (1885-9) that he made his remarkable experiments on electric waves . . . The great advance made by Hertz was the experimental demonstration of the existence of electro-magnetic waves of comparatively low frequency. . . . Wireless telegraphy is the practical development of the experimental facts established by Hertz, and gives to the Hertzian waves an added importance. From this point of view his discoveries rank with Faraday's discovery of the induction of currents."

Hertz accomplished all his remarkable work in a brief life of only 37 years (1857-94).

From *Ency. Brit.*, 11th ed., XXVI., p. 529, we learn that K. A. Steinheil, of Munich, acting on a suggestion given by Gauss, found in 1838 that the earth could be used for the ' return ' in telegraphy, and thereupon he made the further suggestion that the remaining metallic portion of the circuit might, perhaps, some day be abolished and thus a system of wireless telegraphy established!

Sir William H. Preece, F.R.S., between 1882 and 1900 made a number of successful experiments with *inductive* telegraphy. In 1898 Sir Oliver Lodge, F.R.S., examined theoretically the inductive system of space telegraphy.

En. Br., p. 531, " Up to 1895 or 1896 the suggestions for wireless telegraphy which had been publicly announced or tried can thus be classified under three or four divisions, based respectively upon electrical conduction through the soil or sea, magnetic induction through space, combinations of the two foregoing, and lastly, electrostatic induction. All these

older methods have, however, been thrown into the background and rendered antiquated by inventions which have grown out of Hertz's scientific investigations on the production of electric waves. . . . D. E. Hughes made some remarkable observations and experiments in or between the years 1879 and 1886, though he did not describe them until some twenty years afterwards. He discovered a fact, subsequently rediscovered by others, that a tube of metallic filings loosely packed, was sensitive to electric sparks made in its vicinity, its electrical resistance being reduced, and he was able to detect effects on such a tube connected to a battery and telephone at a distance of 500 yards. (*Vide* Fahie, *History of Wireless Telegraphy*, p. 289; also an important letter by D. E. Hughes in *The Electrician*, London, 1899, 43, 40.) p. 532, "Branly was the first to investigate and describe in 1890 the fact that an electric spark at a distance had the power of changing loose aggregations of metallic powders from poor to good electric conductors, and he also found that in some cases the reverse action was produced." p. 532, "Between 1894 and 1896 G. Marconi gave great attention to the improvement of devices for the detection of electric waves. . . . The object which Marconi had in view was not merely the detection of electric waves, but their utilization in practical wireless telegraphy. Sir William Crookes had already suggested in 1892, in the *Fortnightly Review* (Feb., 1892), that such an application might be made, but no one had overcome the practical difficulties or actually shown how to do it. G. Marconi, however, made the important discovery that if his sensitive tube or coherer had one terminal attached to a metal plate lying on the earth, or buried in it, and the other to an insulated plate elevated at a height above the ground, it could detect the presence of very feeble electric waves of a certain kind originating at a distance." At p. 540, in dealing with the problem of locating the direction of the sending station :—" G. Marconi, however, gave in 1906 the first really practical solution of the problem by the use of bent transmitting and receiving antennæ. . ."

That Darwin's loss of interest in Poetry, Music and Art was due to his deep and constant Study of Natural Science

Prof. E. B. Poulton, D.Sc., F.R.S., in *Charles Darwin and the Origin of Species* (1909), deals fully with this subject, and

we must refer our readers to that work for details and the complete account of the matter (pp. 59, 79, and 256). Briefly it is this: Darwin for most of his life had extremely poor health; in fact, it is not till details of his ill-health are learned that one begins to have some idea of his marvellous genius and industry. His health broke down between 1836 and 1842, and was never recovered, and this was the period at which, as he tells us, his æsthetic tastes began to alter. Due to his poor health he was able to do work of any kind (even reading and conversation with scientific friends!) for only very few hours each day, usually under four, and there were many periods when for weeks he could do nothing. Being so whole-heartedly devoted to natural science, and feeling called to do so much at it (for which the world is duly and greatly indebted to him) left him, in the circumstances, no time for anything else, but it is utterly wrong to say his study of science *per se* caused him to lose interest in other matters. It was simply his ill-health which prevented his giving time to the "lost" subjects.

That Roger Bacon invented or introduced the Mariner's Compass

This was dealt with by M. Esposito in an article, "Notes on the Early History of the Mariner's Compass," in the Nov., 1918, issue of the *Geographical Journal*, wherein he shows that Roger Bacon was neither the inventor nor the introducer of the mariner's compass. The compass was in use in Europe in the 12th century and in China 2,000 years before that, but Dr. Herbert Chatley, D.Sc. (Engineering), tells me the Chinese did not invent the compass.

That Galileo invented the Telescope

It is common to attribute this invention to Galileo, but that does not make it a fact. He was one of the earliest users of the instrument, and this to great effect, for, among other things, he discovered by means of it the four moons of Jupiter; in fact, he *made* the instrument in 1609 which enabled him to do this, but Hans Lippershey, a spectacle maker, of Middelburg, Holland, had made a telescope the year before, and Galileo used this as the model for the one he constructed in 1609.

There is another who may be claimed as the creator of the telescope, who flourished 400 years before this, viz., the great Englishman and first modern man of science, Roger Bacon. His work on optics held the field for two centuries. He had an excellent grasp of mathematical optics, and described a system which is equivalent to a two-lens apparatus, and there is trustworthy evidence that he actually used a compound system of lenses equivalent to a telescope.

In *Ency. Brit.*, *sub* Galileo, it is said : " Galileo was not the original inventor of the telescope. That honour must be assigned to Hans Lippershey, an obscure optician of Middleburg (*sic*), who, on the 21st of Oct., 1608, offered to the States of Holland three instruments by which the apparent size of remote objects was increased. But here his glory ends and that of Galileo begins."

That Gunpowder was invented by the German Monk Bertholdus Schwartz

We are sure our readers will be glad to have the above claim definitely refuted.

Oscar Guttmann, M.I.C.E., F.I.C., F.C.S., in his *Monumenta Pulveris Pyrii* (1906), p. 4, states, " We can accordingly accept it as a fact that as early as 1242 Roger Bacon knew of a gunpowder mixture. His writings contain no allusions to the use of powder in guns, nor do they even show a knowledge of their existence, and it would therefore seem that Bacon had known the destructive but not the propellant force of gunpowder."

Ency. Brit., *sub* " Gunpowder," has, " It is, however, certain that it was *not* invented, as has been often stated, by the German monk Bertholdus Schwartz about 1320, although Wilkinson, in his *Engines of War*, considers Schwartz may have suggested the use of a mortar. . . Roger Bacon, who was born in 1214, refers, *circa* 1267, to an explosive mixture of the nature of gunpowder as known before his time. ."

Harms. Ency., *sub* " Gunpowder," states, " The early history of gunpowder is very obscure, but what evidence there is seems to point to China as its birthplace. It was probably first used in Europe as a propellant by the Moors in the 12th century, its mixture was described by Roger Bacon in the 13th, and it was used in warfare by the English in the 14th (at Crécy). . ." Vide *Life of Benvenuto Cellini*, pp. 49 and 286.

That Inoculation against Smallpox was first introduced or practised in England by Jenner

Like so many misunderstandings this one may be due to terminology. Jenner appears to have been the first to use cow-pox virus for inoculating human beings against small-pox. Now the Latin word for "cow" is *vacca*, so that vaccination implies inoculation with cow-pox, and it was Jenner whose researches led him to discover that such inoculation was of great advantage in preventing attack by small-pox, and in causing a much milder illness in the cases in which it did not prevent attack. Consequently we find him described in *Ency. Brit.* as "the discoverer of vaccination," he having announced his discovery in 1798, but it is clearly pointed out that his "procedure was based almost exactly on the earlier practice of inoculating the small-pox. . . To replace small-pox inoculation by cow-pox inoculation in certain specified circumstances was Jenner's tentative project. . . Jenner's originality in starting vaccination in practice is for the most part misunderstood."

Ency. Brit., sub Montagu, Lady Mary Wortley (1690-1762) informs us that, "Her husband being ambassador to the Porte in 1716, she accompanied him to Constantinople, and wrote to her friends at home brilliant descriptions of Eastern life and scenery. These letters were not published till 1763, the year after her death. . . In one of them she described the practice of inoculation for the small-pox, and announced her intention of trying it on her own son, and of introducing it in spite of the doctors into England."

At p. 279 of *A Short History of Social Life in England*, by M. B. Synge, F.R.Hist.S., we read, "It is interesting to note that it was reserved for a woman to introduce into England the system of inoculation for small-pox. This disease was still rampant, some 3,000 persons dying of it in London alone in the year 1719. Inoculation, which consisted in procuring a slight attack of small-pox by means of incision, was practised at Constantinople, where Lady Mary Wortley Montagu had her five-year-old boy inoculated in 1717. The child at once had a slight attack of small-pox, from which he easily recovered. The King's daughter-in-law took up the subject; experiments were made on condemned criminals and charity children, and the results being satisfactory, the two little Princesses of nine and eleven, grand-daughters of George I.,

were inoculated with marked success. But the idea grew slowly, and it was not till 1740 that inoculation came into general use."

This fact is also recorded at p. 47 of *Bacteriology* by W. E. Carnegie Dickson, M.D.

Thus while fully acknowledging the great debt of mankind to Jenner for his discovery, in the light of the foregoing it was not such a brilliant and wide departure from previous practice as some are in the habit of thinking. I think, too, that the milkmaid's part in Jenner's " discovery " should be more generally recognised, for it was *she* who had discovered that persons who had had cow-pox were practically immune from small-pox, and she told Jenner this fact.

Vide p. 124, *Letters* of Lady Mary Montagu ; pp. 263 and 304-8, *Lady Montagu and Her Times ; Notes and Queries*, May 26, 1923, p. 413, and June 9, 1923, p. 455.

That on learning that the French Poor could not get Bread, Marie Antoinette said : " Then why do they not eat Cake ? "

The following reply appeared at p. 53 of *Notes and Queries* of Feb., 1919 :—

" FRENCH REVOLUTION : ' EAT CAKE ' (12 S. iv. 272).—Though this saying is often attributed to Marie Antoinette, it is older than the period of the French Revolution. Mr. Edward Latham in his *Famous Sayings and their Authors* quotes a sentence proving this from partie i. livre vi. of Rousseau's *Confessions* ; but Rousseau's description of the incident which caused him to record the phrase is so interesting that it is worth while giving pretty fully :—

" ' [Madame Warens] avoit à Grenoble une amie appelée madame Deybens, dont le mari étoit ami de M. de Mably, grand-prévôt à Lyon. M. Deybens me proposa l'éducation des enfans de M. de Mably : j'acceptai, et je partis pour Lyon. . .

" ' J'avois tout-à-fait perdu chez maman le goût des petites friponneries, parce que, tout étant à moi, je n'avois rien à voler . . . mais . . . j'aurois grand'peur de voler comme dans mon enfance si j'étois sujet aux mêmes désirs. J'eus la preuve de cela chez M. de Mably. Environné de petites choses volables que je ne regardois même pas, je m'avisai de convoiter un certain petit vin blanc d'Arbois très-joli, dont quelques verres que par-ci par-là je buvois

à table m'avoient fort affriandé . . . Il resta toujours agréable à boire, et l'occasion fit que je m'en accommodai de temps en temps de quelques bouteilles pour boire à mon aise en mon particulier. Malheureusement je n'ai jamais pu boire sans manger. Comment faire pour avoir du pain? Il m'étoit impossible d'en mettre en réserve. En faire acheter par les laquais, c'étoit me déceler, et presque insulter le maître de la maison. En acheter moi-même, je n'osai jamais. Un beau monsieur, l'épée au côté, aller chez un boulanger acheter un morceau de pain, cela se pouvoit-il? Enfin je me rappelai le pis-aller d'une grande princesse à qui l'on disoit que les paysans n'avoient pas de pain, et qui répondit: Qu'ils mangent de la brioche.'

"Mr. Latham also states that Alphonse Karr (*Les Guêpes*, April, 1843) alludes to a work dated 1760, where a Duchess of Tuscany is credited with the same remark. Karr's words are:—

"'Ce qui me paraît prouver à peu près que le mot n'a pas été dit par Marie Antoinette, mais retrouvé et mis en circulation *contre* elle.'

"Latham misquotes Karr as saying 'Et mis en circulation *par* elle.'

"The *Confessions* were written *c.* 1766, but the incident referred to by Rousseau occurred *c.* 1740.—E. G. C."

That Edison invented the Kinematograph

At p. 504 of *Nature* of Feb. 28, 1918, there appeared a review of *Thomas A. Edison*, the *Life-story of a Great American*, in which it was stated: "Again, one would imagine that the kinematograph was wholly Edison's invention. As a matter of fact he was preceded on the photographic side by Muybridge and by Marey, and did not, in the first instance, carry his apparatus beyond the peep-show stage. The credit of first projecting the pictures upon a screen from a film belongs to R. W. Paul in England and to Lumière in France.—E. C."

That it was Charles Spurgeon who slid down the Handrail of the Steps to the Pulpit to illustrate how easy is the road to Hell

In a brief account of Gen. William Booth's life in the *Daily Mail* of Aug. 21, 1912, it was stated: "For some ten years he continued to preach and visit as a layman.

Then, at twenty-five, he became a Methodist minister. Soon he began to be in request as a special preacher. He could always be relied upon to draw a crowd. Sometimes his methods were decidedly sensational. It has often been told of Spurgeon how, in order to illustrate the facilis descensus Averni (the easy road to Hell), he one day slid down the stair-rail of the pulpit. It was *not really Spurgeon* at all who did this; it was *William Booth.* Before long there were murmurs in the Methodist New Connexion. The truth was, William Booth had grown too big for it. Some sort of an arrangement was proposed at a conference which would have had the effect of cramping his magnificent energies, of imprisoning his talents in a narrow round of duties calling for no special gifts. When the proposal was made, a woman's voice, clear and resolute, rang out from the gallery, 'Never!' The minister whose position was at stake turned his head, met his wife's flashing gaze, and echoed her protest, 'Never!' They left the hall together, as many thought, a ruined pair. He had given up his means of livelihood. He had now to depend for his and his family's support upon his efforts as an unattached evangelist."

That Dr. Dionysius Lardner stated that the Atlantic could not be crossed by Steam Power

Few statements are made with the object of disparaging engineers more frequently than this one; alas! even engineers make it sometimes! For example, in his presidential address on "Ancient and Modern Engineering," to the Manchester Association of Engineers, on Oct. 9, 1915, Mr. Samuel Boswell said (p. 7): "Occasionally it can be cruel, as in the case of Dr. Lardner, who wrote an essay to prove the impossibility of a steamship ever being able to cross the Atlantic, only to find the first consignment of his book carried to New York by a steamship."

The "book" to which Mr. Boswell refers is probably the *Edinburgh Review* for the quarter April-July, 1837, in which Dr. Lardner, as editor, wrote a long unsigned article on the project. It is certainly an extremely cautious article, and Dr. Lardner was certainly not optimistic, but he never stated that the voyage could not be made entirely by steam He spoke on the subject at the British Association meeting at Bristol on Aug. 25, 1837, and on Aug. 27, 1837, *The Times* reported the proceedings. The following is an extract from

that report: "Dr. Lardner said . . . He was aware it had been stated that his own opinion was averse to it (viz., to the 'possibility of extending steam navigation to voyages of extraordinary length'). This statement was totally wrong; but he did feel that great caution should be used in the adoption of the means of carrying the project into effect." Later Dr. Lardner remarked that "he considered the voyage practicable."

That Nell Gwynne induced Charles II. to found the Royal Chelsea Hospital

The author's readers may have difficulty in believing that iconoclasm is not *per se* a pleasure to him, especially when so picturesque a woman is involved, as on the present occasion; but we have set our hand to the plough to assist in uprooting all that is not truth, so the unpleasant must be done!

Prof. Bensly and Mr. Gwyther replied at p. 276 of *Notes and Queries* of Sept. 30, 1916, as follows:—

"Nell Gwynne and the Royal Chelsea Hospital (12 S. ii. 210).—According to the note on p. 202 of the edition of Peter Cunningham's 'Story of Nell Gwyn' by Gordon Goodwin,

"'The supposition—to which much of her popularity is due—that Nell Gwyn suggested the foundation of Chelsea Hospital is altogether baseless. It was Sir Stephen Fox, paymaster-general of the forces, who inspired Charles II. with the idea of the erection of a Royal Hospital "for emerited soldiers," and Fox gave munificently to the hospital, "as became him who had gotten so vast an estate by the soldiers." The facts connected with the history of the foundation are clearly set forth by Evelyn in his "Diary," and he makes no reference to Nell Gwyn having had any concern in the matter.'"

"I have not Mr. H. B. Wheatley's notes at hand, to which the above-named edition is indebted.

"How far back can the tradition about Nell Gwynne be traced, a tradition perpetuated in a well-known poem of Swinburne's?—EDWARD BENSLY.

"'There is an early tradition that Nell Gwynne materially assisted in the foundation of Chelsea Hospital, but it is unsupported by official records or contemporary evidence.'—

London Past and Present, by Wheatley and Cunningham, Vol. I., p. 385.

"'The first idea of converting it into an asylum for broken-down soldiers, according to popular tradition, sprang from the charitable heart of Nell Gwynne. As the story goes, a wounded and destitute soldier hobbled up to Nell's coach window to ask alms, and the kind-hearted woman was so pained to see a man who had fought for his country begging his bread in the street that she prevailed on Charles II. to establish at Chelsea a permanent home for military invalids. We should like to believe the story; and indeed its veracity may not be incompatible with a far less pleasant report that Charles made a remarkably good thing, in a pecuniary sense, out of Chelsea Hospital.'"—*Old and New London*, by Edward Walford, Vol. V., p. 70.

See also *History of London*, by Loftie, Vol. II., p. 264.

A. GWYTHER.

[Mr. A. R. Bayley thanked for reply.]

The building was designed by Sir Christopher Wren, and was erected between 1682 and 1690, though not completed till 1702.

Mr. J. S. Jowett, writing on Nov. 5, 1915, said: "From the references in *Pepys' Diary* to Chelsea Hospital and to Nell Gwynne—he knew both well—and the absence of any reference to Nell's influence over Charles II. in the matter, I am of opinion that the 'inducement' was improbable."

The *Daily Telegraph* of May 30, 1912, stated: "Although in romance and popular opinion Nell Gwynne is credited with having inspired the idea in the mind of Charles II. of creating the Royal Chelsea Hospital, officially the credit of its foundation is given to Sir Stephen Fox, the first Paymaster-General." *Ency. Brit.*, 11th ed., XII., 750, speaks of her as a clever comedy actress, witty, generous, good tempered, and high spirited. "Tradition credits the foundation of Chelsea Hospital to her influence over the King."

The *Dic. of Nat. Biog.* has, "The supposition that she induced Charles to found Chelsea Hospital had something to do with the favour always extended to her life." In April, 1915, *Sweet Nell of Old Jewry* was performed, and two pages of the programme consisted of an article *Why Nell Gwyn is Immortal*, by Miss Julia Neilson. The author fears this was written more "from the heart," as the expression is, than from reference to reliable sources; but it is an admirable

example of how these traditions are kept alive. It is so much easier to write without making a thorough search, especially if subconsciously you know the result of such a search is likely to upset a cherished idea !

Vide also Lyson's *Environs of London*, II., p. 55; *Henry Fox, first Lord Holland;* by Lord Ilchester (p. 12); and Hon. J. W. Fortesque in the Quarterly Review, Apr. 1920.

That Napoleon surrendered his Sword to Capt. Maitland, and that the latter stood Bare-headed in the presence of the Emperor

" Napoleon and the *Bellerophon* (11 S. xi. 339, 438; xii. 35). —The engraving which faces p. 477, Vol. II. of Baines's *History of the Wars of the French Revolution* (1817), depicting Napoleon's arival on board the *Bellerophon*, is inaccurate in two respects. (1) The Emperor did not, as represented, surrender his sword to Capt. Maitland. (2) Capt. Maitland did not, as represented, stand uncovered in the Emperor's presence. There is satisfactory evidence on both points from an eye-witness of the scene, the midshipman, George Home. Home, describing the Imperial costume on the occasion, distinctly states (1) that Napoleon ' was without any sword, I suppose as emblematical of his changed condition ' ; (2) that Maitland ' only raised his hat, as to a general officer, and remained covered while the Emperor spoke to him.' But, even without this witness, the question as to the sword could be decided against the engraving. Napoleon, in his written protest on board the *Bellerophon*, declared that he had come voluntarily, that he was England's guest, not a prisoner of war : ' Je ne suis pas prisonnier, je suis l'hôte de l'Angleterre ' (see Las Cases, *Memorial de Sainte-Helene*, tome i. partie i., p. 66, Londres 1823). Napoleon's view of himself as England's guest precludes any proffer or surrender of his sword. Home's account forms Additional Appendix III. to the 1904 edition of Capt. Maitland's *Narrative*, and the quotations given above will be found at pp. 248, 249. Napoleon retained his sword. Admiral Viscount Keith writes to Capt. Maitland, 7 Aug., 1815, regarding the transhipment from the *Bellerophon* to the *Northumberland :* ' When the General quits the ship it is not intended to take his sword from him but to let him wear it, but not the others ' (see Maitland's *Narrative*, p. 189, 1904 edition, or p. 192, 1826 edition).

" Errors in all sorts of matters of detail are quite characteristic of artists' representations of historical events.

" The Mount, Belfast. JOHN SALMON."

Notes and Queries, Aug. 7, 1915, p. 105.

That " Pepper's Ghost " was invented by the late Prof. J. H. Pepper, of the Polytechnic, Regent Street, London

The optical illusion known to the world as " Pepper's Ghost " was invented by an engineer, Henry Dircks, F.R.S.E. He had the usual difficulty in getting it taken up, but ultimately showed it to Prof. Pepper, who realised its commercial possibilities, and " staged " it at the Polytechnic, which was then of a different character from what it is now. Henry Dircks was the Hon. Sec. of the Liverpool Literary and Scientific Institution.

In the *Dictionary of National Biography*, Supplement Vol. III., 1901, p. 259, we read, " . . . During the winter of 1862 . . . Pepper succeeded in reviving the popularity of the institution [the Royal Polytechnic] and ensuring its future by means of an optical illusion described by the *Times* as the most wonderful ever put before the public. In Sept., 1858, Henry Dircks, of Blackheath, had communicated to the British Association the details of an apparatus for producing ' spectral optical illusions ' (see *Mechanics' Magazine*, Oct. 7, 1858 ; *Engineer*, Oct. 1, 1858). The idea was rejected by several entertainers, but Dircks had sufficient faith in it to have the necessary apparatus made. Pepper no sooner saw this than he cordially welcomed the invention, and, after some not very important modifications in the machinery, exhibited the ' ghost ' for the first time on Dec. 24, 1862, in illustration of Dickens' *Haunted Man*. On Feb. 5, 1863, the apparatus was patented in the joint names of Pepper and Dircks, both renouncing any pecuniary claim on the Polytechnic. Dircks afterwards complained, with some apparent justification, that he had been deluded into this arrangement, and that his name as that of the sole inventor was unduly obscured in the advertisements of the exhibition. Popularly known as ' Pepper's Ghost,' the illusion had an enormous vogue. . ."

Prof. J. H. Pepper wrote *The True History of Pepper's Ghost* in 1890. Prof. Pepper (probably in 1869) published *Cyclopædic Science Simplified*, an excellent book for boys and girls, and therein he describes " what is familiarly called ' The Ghost Illusion.' " *Not a word is said of Dircks*, which is surely

not " cricket," though Pepper does not go so far as to claim the invention as his own, which he does in the case of several other illusions.

That Nero played a Lyre or Violin, and sang on the Tower of Mæcenas while Rome was Burning

" Plantagenet, I will ; and like thee, Nero,
Play on the lute, beholding the towns burn."
Henry VI. (i.), I., iv., 95.

Dr. C. C. Bombaugh, A.M., M.D., p. 411 *Facts and Fancies* (1905), " None of the stereotyped falsities of history has been reiterated with more persistence than that which represents the Emperor Nero on the summit of the tower of Mæcenas fiendishly fiddling and singing his verses while Rome was burning. Aside from the anachronism as to fiddling—the violin only dates from the middle of the sixteenth century—and admitting that the classic lyre of antiquity was meant, we have the authoritative statement of Tacitus that at the time of the fire Nero was at his villa at Antium, 50 miles from Rome. There is little doubt that Nero was the most depraved representative of pagan sensuality, but on the occasion of a conflagration which was planned and prompted by him for a wise purpose, he exhibited qualities greatly to his credit. Lanciani says that Nero conceived the gigantic plan of renewing and rebuilding the city, and as it was ' crowded at every corner with shrines and altars and small temples which religious superstition made absolutely inviolable, and as the work of improvement was fiercely opposed by private owners of property, and gave occasion to an endless amount of lawsuits and appraisals and fights among experts, he rid himself of all these difficulties in the simplest and easiest way.' . . . Nero caused an enormous number of tents and wooden booths to be secretly prepared for the houseless multitude, and ordered fleets of grain-laden Mediterranean vessels from Sardinia, Sicily, Numidia and Egypt to be conveniently near to prevent famine. This comprehensive provision for material improvement was made by a broad-minded, public-spirited man, who was in advance of his age, and who transformed narrow lanes into broad avenues, filthy slums into shaded squares, and fountains and shabby houses into magnificent public and private buildings."

Readers will, the author is sure, admit that the foregoing puts Nero in a new light ! He may, in fact, be considered as

the prototype of Baron Haussmann, who did so much to improve Paris.

An inquiry in *Notes and Queries* resulted in the following replies in the issue of Sept 2, 1916, at p. 198," Rome and Moscow (12 S. ii. 149).—A footnote to Chap. XVI. of Gibbon's *Decline and Fall of the Roman Empire* (in which allusion is made to the incredible stories circulated at the time, citing especially that relating to Nero playing his lyre while his capital was burning) is given as follows :—

" ' We may observe that the rumour is mentioned by Tacitus with a very becoming distrust and hesitation, whilst it is greedily transcribed by Suetonius, and solemnly confirmed by Dion.'

" It is tolerably clear from these remarks that Gibbon attached but little credence to the story.

" It is a generally accepted historical fact, hardly open to question, that Moscow was set on fire by Muscovite incendiaries acting under the orders of Rostopchin, the Governor of the city. Napoleon himself is reported to have said in reference to Rostopchin, ' The miserable wretch ! To the dire calamities of war he has added the horrors of an atrocious conflagration, created by his own hand, in cold blood ! ' (See Bussey's *History of Napoleon*, which gives full particulars of the circumstance.) WILLOUGHBY MAYCOCK."

" 1. Mr. H. Stuart Jones, in *The Roman Empire*, 1908, p. 78, says :—

" ' In A.D. 64 took place . . . the burning of Rome. . . . It was neither the first nor the last of such visitations, and no proof can be adduced that it was other than accidental ; but it owes undying fame in part to the rumour which gained credence that Nero was its author and sang an aria from his own opera on the Fall of Troy as he watched the flames, in part to the fact that it led directly to that persecution of the Christians which brought to the apostles of the Jew and the Gentile the crown of martyrdom. . . . To Nero the burning of Rome seemed a fortunate accident, since it enabled him to rebuild the city on a rational and healthy plan, sweeping away its foul and dangerous slums, and replacing them by wide arcaded thoroughfares, and above all to create the palace of his dreams . . . the Golden House.'

" 2. I understand that Dr. Holland Rose, lecturing at the recent Cambridge Extension Meeting, stated that Moscow

was accidentally set alight by a party of drunken marauders —much to the wrath of the reigning Tsar.

A. R. BAYLEY."

That Richard III. was a Hunchback, as appears to be implied by his nickname "Crouchback"

"But I, that am not shaped for sportive tricks,
Nor made to court an amorous looking-glass;—
I, that am rudely stamped, and want love's majesty
To strut before a wanton ambling nymph;
I, that am curtailed of this fair proportion,
Cheated of feature by dissembling nature,
Deformed, unfinished, sent before my time
Into this breathing world, scarce half made up,
And that so lamely and unfashionable
That dogs bark at me as I halt by them;—
Why I, in this weak piping time of peace,
Have no delight to pass away the time,
Unless to spy my shadow in the sun,
And descant on mine own deformity."

King Richard III., I., i., 14-27.

The above is only one of many references by Shakespeare to the subject. The others will be found at:—

King Richard III., I., ii., 54 and 236.
King Richard III., I., iii., 242.
King Richard III., III., iv., 70.
King Richard III., IV., iv., 76.
King Henry VI., part (3), II., ii., 95 and 136.
King Henry VI. part (3), V., v., 29.
King Henry VI., part (3), V., vi., 50.

Ency. Brit. XX., 542, has, "Tradition is divided as to Richard's personal appearance, and the story of his deformity is possibly derived from Lancastrian malignity and from a misunderstanding of his nickname Crouchback. His courage, energy and ability would have made a great and honoured name had not those qualities been matched by extreme ferocity and unscrupulousness, and perverted to an evil use by the turbulence of the time and his own nearness to the throne."

Prof. Charles Oman mentions the deformity at pp. 265 and 271 of his *History of England*: "Then Gloucester burst out. 'It is my brother's wife,' and baring his left arm—which all men knew to be somewhat deformed since his earliest years—he cried, 'Look what yonder sorceress and Shore's wife and those who are of their council have done unto me with their

witchcrafts.' " And at the second reference : " Thus ended the prince [Referring to Richard's death, fighting desperately, at the Battle of Bosworth Field.] who had wrought so much evil, and won his way to power by such unscrupulous cunning and cruelty. He was only 33 when he was cut off . . . . Historians of the next generation drew his portrait even darker than he deserved, making him a hideous hunchback with a malignant distorted countenance. As a matter of fact, his deformity was only that his left arm was somewhat withered [*Cf.* the ex-Kaiser in character and deformity !] and his left shoulder consequently lower than his right. His portraits show a face not unlike that of his brother Edward, but thinner and set in a nervous and joyless look of suspicion."—Vide *Life of Henry VII.*, Dr. James Gairdner.

Mr. May, at the Casual Club, on Jan. 15, 1920, said," There are nine contemporary portraits of Richard III., none of which shows any sign of deformity. He also referred to the very heavy Yorkist armour which Richard must have worn, and the deeds he did in battle, which he pointed out were not in keeping with the King's alleged deformity.

That Sir Walter Raleigh was the first to introduce the Potato into the British Isles

Nature of Oct. 31, 1918, at p. 176, had a long article on *The Raleigh Tercentenary*, more than half of which was devoted to the potato question, which portion is quoted below :—

" In connection with the tercentenary celebrations it is natural that some allusion should be made to the services Raleigh is commonly believed to have rendered to his country by introducing the potato. In the aggregate the literature of this plant would form a long series of volumes, and that dealing with its introduction into Europe and the British Isles is so copious that only the patient and leisured would care to study it thoroughly. This copiousness arises, no doubt, from the fact that, in spite of the reiterated statement that Raleigh brought the potato from Virginia, there is ample ground for controversy, and controversy there has been, leaving us very much shaken in our faith in the generally accepted account of its introduction by him. The appearance of the potato in the British Isles is supposed to date from 1586, and the tercentenary of its introduction was celebrated in 1886. But the first evidence we possess to show that the

tuber was in cultivation in this country is that afforded by the catalogue of the plants in Gerard's garden in Holborn, published in 1596. Gerard, in his ' Herball ' of 1597, describes and figures it under the names of ' Batatas Virginiana sive Virginianorum & Pappus, Potatoes of Virginia,' and tells us that ' it groweth naturally in America, where it was first discovered, as reporteth C. Clusius, since which time I have received rootes hereof from Virginia.'

" We learn from Clusius that the potato was cultivated in Italy in or about the year 1585, having probably been obtained from some Spanish source. It was taken to Belgium in 1586, and some tubers came into the hands of Philippe de Sivry, the prefect of Mons, who cultivated them, and sent, early in 1588, two tubers to Clusius at Vienna. It is thought that Gerard did not obtain the potato from Clusius, but, if the former may be trusted, it was obtained direct by him from Virginia. Gerard, however, is known to have handled the truth at least carelessly, and if he did not deliberately make a misstatement with regard to the origin of the plant, he was indifferent about it, and possibly wilfully suppressed information that would have elucidated the point. Introducers of plants of commercial value in later days have not always been quite candid as to their source. Gerard was probably proud of his possession of the potato, for his portrait, published in the ' Herball,' represents him as holding a flowering branch of the plant in his hand, and, for some reason obscure to us, may not have been disposed to divulge its origin. The late Sir James Murray, with his usual thoroughness, investigated the question of the introduction of the potato in connection with his article on the word in the New Oxford Dictionary. He says that Gerard ' was in error in his statement that he obtained it from Virginia. In 1693 its introduction into Ireland was attributed to Sir Walter Raleigh after his return from Virginia (where he never was) ; but no contemporary statement associating Raleigh's name with the potato has been found."

" It appears probable that the potato first reached this country as a result of one of Drake's expeditions to the New World, and it may have been brought on the vessel which, in 1586, conveyed to Plymouth the survivors of the ill-fated British colony in Virginia, and in the course of the voyage was probably taken with other booty from some Spanish ship. Drake as the introducer of the potato is so far accepted that a

monument to him in commemoration of this was erected at Offenburg, in Germany, in 1854. It is extremely doubtful whether Raleigh had really any direct part in the introduction of the plant, but, according to Dr. Brushfield's painstaking researches, published in the Transactions of the Devonshire Association for the Advancement of Science (Vol. XXX., pp. 158-97, 1898), it would appear that he was instrumental in extending its cultivation in this country and in popularising the tuber as a valuable food. He even says: 'That Raleigh was the direct cause of the potato being brought to this land of ours can now scarcely be gainsaid; and to him must certainly be attributed the honour of promoting its cultivation in Ireland, from whence it was subsequently transmitted to England.'"

"An interesting and able article on the subject, written by Dr. B. Daydon Jackson, appeared in the *Gardeners' Chronicle* in 1900 (Vol. XXVII., pp. 161-62 and 178-80).

"It is certainly as a populariser of the practice of smoking, and not as the introducer of the plant, that Raleigh should be remembered with reference to tobacco. Its introduction was accomplished by Sir John Hawkins in 1565, and Raleigh early acquired the habit of smoking, which he succeeded in introducing to Court circles. Dr. Brushfield writes: 'There can be no hesitation in affirming that Raleigh not only introduced it [tobacco] into general use in this country, but . . . . was the first that brought it into fashion.'"

That the correct Name of the famous Dutch Admiral is Van Tromp

Sir Henry Howard dealt with this error at p. 84 of *Notes and Queries* of March, 1918:—

"The surname of the great Dutch admiral in question was 'Tromp,' not 'Van Tromp.' His full name was Martin Harpertzoon Tromp. Why Englishmen generally will insist on calling him 'Van Tromp' I could never understand, and the Dutch laugh at us for doing so. In Holland the 'Van' is not an indication of nobility, as 'Von' is in Germany. It generally only means that the first member of a family with a definite surname chose or was given the name of the place, town, or country seat from which he came, or in which he was living. For instance, 'Lucas van Leyden,' the painter, was thus called 'of Leyden,' because he was a citizen of that city."

The explanation of this mistake may be that the second son of this admiral is sometimes known as Cornelius *van* Tromp, and consequently it would be expected that his father's name was Van Tromp ; but when we remember, as Sir Henry explains, that the *van* means *of*, the point becomes clear.

Other authorities agree that the insertion of Van in the father's name is incorrect.

" Admiral Tromp's English Descendants (12 S. iii. 478, 520 ; iv. 25, 84).—The full name of the famous Dutch admiral was not Martin Hapertzoon Tromp, but Maarten Herpertszoon or Harpertszoon (Martin, son of Herbert) Tromp. It is well known in Holland that no traceable descendants of the hero survive.—W. del Court, 47, Blenheim Crescent, W. 11." —*Notes and Queries*, p. 143, May, 1918.

That the Dutch Admiral Tromp sailed the English Channel with a Broom at the mast-head of his Ship to imply that he had swept the English Admiral Blake from the sea

The following paragraph appeared in *T. P.'s Weekly* of Aug. 28, 1915 :—

" The intention of some Colonial admirers to present to Sir John Jellicoe a silver-mounted miniature broom recalls one of the most famous stories—or rather fables—in the annals of our sea power. It was in November, 1652, that the Dutch Admiral Tromp, a very fine fellow, enjoyed the brief triumph of sailing up and down the English Channel unhindered. The story is always embellished by the statement that he carried a symbolical broom at his mast-head, and I think we have come to like this touch. But there is no evidence of its truth. In his article on Blake in the *Dictionary of National Biography*, Professor Laughton writes : ' Not one writer of any credit, English or Dutch, mentions it even as a rumour ; but months afterwards an anonymous and unauthenticated writer in a newspaper wrote : ' Mr. Tromp, when he was in France, we understand, wore a flag of broom.' The story was probably invented as a joke in the Fleet, without a shadow of foundation. But the explosion of this pleasant myth adds to, rather than detracts from, the appropriateness of the gift to Admiral Jellicoe."

Mr. C. E. Clark, at p. 64 of his *More Mistakes We Make*, deals pretty fully with this fallacy and remarks, " Strange to

say, the story is not of Dutch origin ; no contemporary Dutch account, picture, or ballad makes the slightest reference whatever to the broom hoisted during the three days' battle. It is purely an English invention made months after the Dutch victory—but not before victory had again favoured the English—when there was every temptation to expose Tromp as a braggart who had failed to carry out his boast." Martin Harpertzoon Tromp (1597-1653), Dutch Admiral who fought our Admiral Blake off Dover on May 19, 1652, and Dungeness on Nov. 30, 1652, with pretty equal results, though in each case Tromp had more ships than Blake. " The statement that he sailed up the Channel with a broom at his mast-head in token of his ability to sweep the seas is probably mythical."—*Ency. Brit.*, 11th ed., XXVII., 305.

The *Harms. Ency.*, Vol. X., p. 258, says, " There seems to be no foundation for the old fable that the elder Tromp cruised in the Channel with a broom at his mast-head."

That the Countess of March was called " Black Agnes " on account of her Complexion

T. F. Thiselton-Dyer, M.A., p. 57, *Folk-lore of Women* (1905) : " Scottish history affords a good specimen of a dark woman in the famous ' Black Agnes,' the Countess of March, who was noted for her defence of Dunbar during the war with Edward III., maintained in Scotland from 1333 to the year 1338.

> ' She kept astir in tower and trench,
> That brawling, boisterous, Scottish wench ;
> Came I early, came I late,
> I found Black Agnes at the gate.'

According to Sir Walter Scott the Countess was called Black Agnes from her complexion. She was the daughter of Thomas Randolph, Earl of Murray. But this statement has been disputed, and it is affirmed that the lady in question was so nicknamed from the terror of her deeds, and not from her dark complexion."

That Lucretia Borgia was guilty of many almost indescribable Iniquities

Mr. C. E. Clark, at pp. 62-3 of his *More Mistakes We Make*, refutes the popular belief, and says, " Lucretia was not merely free from blame, but was universally respected

for her charity, piety and justice." The *Century Cyclo. of Names* says, "She was a woman of great beauty and ability, a patron of learning and the arts. She was long accused of the grossest crimes, but recent writers have cleared her memory of the worst charges brought against her." At p. 53 of Vol. IV. of *Ency. Brit.* we find Lucretia Borgia's life, after her marriage to the Duke of Ferrara's son, was prosperous and uneventful, or at most only troubled by the not very well attested homage of Cardinal Bembo. She obtained universal respect by her piety and prudence, and her patronage of men of letters, and died in 1520. In fact, although intelligent and highly educated, she was essentially a commonplace woman, incapable from every point of view of the atrocities imputed to her by libellers in her own day, and by poets and romancers ever since."

That the poet Burns dined at the Globe Inn, Dumfries, on July 21, 1796, got Intoxicated, left the inn, fell asleep outside it, and died there during the night

The following paragraph appeared in *T.P.'s Weekly* for Dec. 12, 1913 :—

"Burns' Last Illness—J. C. (Gorebridge) writes: Many of your Scottish readers will be sorry that *T.P.* accepts the popular story about Burns' last illness. The story that Burns fell asleep outside the Globe Inn is traditional, and cannot be accepted as authentic. His first biographer, Hown, never mentioned it. Dr. Robert Chambers, whose life of the poet, revised by Dr. William Wallace, is the last word on the subject caused enquiries to be made on the spot, and the tradition, according to him, was that Burns fell asleep, not outside the inn, nor on account of intoxication, but inside the inn, and his sleep was due to the physical weakness from which he suffered after a sharp attack of rheumatic fever, and the drugs which he had been taking to counteract it. Dr. Currie says he had been in ill health for a year before his death. Burns was able to be at a Freemasons' meeting in April, but he died in July—more than six months after the supposed Globe Inn dinner."

There is nothing which supports the tradition in either the 9th or 11th editions of *Ency. Brit.*

To the editions of Burns' poems published by Thos. Nelson & Sons in 1902 there is added two addresses delivered

by Lord Rosebery in Dumfries and Glasgow in 1896, and a biographical sketch.

Lord Rosebery said in Dumfries, "You have in this town the house in which he died." If he died in a house he cannot very well have died in a gutter! Lord Rosebery continued later, "There he remained three weeks, but was under no delusion as to his state. 'Well, madam,' he said to Mrs. Riddell on arriving, 'have you any commands for the other world?' He sat that evening with his old friend, and spoke manfully of his approaching death, of the fate of his children, and his fame; sometimes indulging in bitter-sweet pleasantry but never losing the consciousness of his condition. In three weeks he wearied of the fruitless hunt for health, and he returned home to die. He was only just in time. When he re-entered his home on the eighteenth he could no longer stand; he was soon delirious; in three days he was dead."

He was only 37 at his death, and yet had attained immortality!

That Cleopatra was an Egyptian

She was a daughter of Ptolemy XI., surnamed Auletes, who was the illegitimate son of Ptolemy VIII., son of Ptolemy VII. The Ptolemies formed the Greek dynasty in Egypt which ended with Cleopatra. Cleopatra was thus a Greek.

That Diogenes lived in a Tub

Mr. C. E. Clark, p. 228, *Mistakes We Make* (*c.* 1897), refutes the story, and says it "had no better origin than a comment by his biographer, Seneca, who was not born till more than three hundred years after the cynic's death: 'A man so crabbed ought to have lived in a tub like a dog.'" Brewer (*Phrase and Fable*) says, ". . . lived, according to Seneca, in a tub." [Note the important difference between the two statements! This is evidently *one* way in which historical inaccuracies arise.] The *Harms. Ency.* (1906) says "Story doubtful," and refers to Zeller's *Socrates and Socratic Schools*. Smith's *Small Classical Dic.*, p. 193, says, '"according to the common story, took up his residence in a tub . . ." and does not refute it. "The stories which are told of him are probably true; in any case they serve to illustrate the logical consistency of his character. He inured himself to the vicissitudes of the weather by living in a tub belonging

to the temple Cybele."—*Ency. Brit.*, 11th ed., VIII., 282. But the writer of the article in the 9th ed. of *Ency. Brit.* is less credulous, for he says: "That he took up his abode in a cask belonging to the temple of Cybele is a circumstance liable to suspicion, from being more frequently alluded to by the satirists than by the biographers of Diogenes."

That Marat, the Revolutionary Leader in the French Revolution, was a Frenchman

His father was a Sardinian, his mother a Swiss, and he was born at Boudry, in the principality of Neuchatel, Switzerland, so we may safely call him a Swiss.

For long articles on Marat vide *Notes and Queries*, 1922, pp. 381, 403, 422, 443, etc.

That Marat, the Revolutionary Leader, was a Horse Doctor or Veterinary Surgeon

He was a physician of Court standing, and a man of considerable scientific attainments, as will be learned from an account of his life in *Ency. Brit.*, XV., 526, from which we abstract the following, "He settled in Church Street, Soho, a fashionable district, and practised his profession. . . . In this year, 1775, he visited Edinburgh, and on the recommendation of certain Edinburgh physicians was, on June 30, made an M.D. of St. Andrews University. . . His fame as a clever doctor was now great, and on June 24, 1777, the Comte d'Artois, afterwards Charles X. of France, 'owing to the report he had heard of the good and moral life and of the knowledge and experience in the art of medicine of J. P. Marat,' made him by brevet physician to his guards, with 2,000 livres a year and allowances. Marat was soon in great request as a Court doctor among the aristocracy; and even Brissot, in his *Mémoires*, admits his influence in the scientific world of Paris."

That the origin of the Pennant was the Whip which Admiral Blake is said to have fixed to the Mast-head of his Ship when the Dutch Admiral Tromp is said to have fixed a Broom to his

To begin with, Tromp (not Van T.) did not fix a broom to his mast-head (*quod vide*). This alone rather takes the wind out of the sails (or of the pennant) of the present story, but

a more definite proof is that the poet Drayton, who lived long before Blake, mentions the pennant in his poem on the Battle of Agincourt.

That the art of Photography was invented by Daguerre

Sir Francis Galton, F.R.S., p. 7, *English Men of Science* (1874), " Great discoveries have often been made simultaneously by workers ignorant of each other's labours. This shows that they had derived their inspiration from a common but hidden source, as no mere chance would account for simultaneous discovery. In illustration of this view it will suffice to mention a few of the great discoveries in this generation. That of photography is most intimately associated with the names of Niépce, Daguerre and Talbot, who were successful in 1839, along different lines of research, but Thomas Wedgewood was a photographer in 1802, though he could not fix his pictures." The article on photography in *Ency. Brit.*, XVIII., 821, supports Galton's statement.

That Thomas Paine was an Atheist

He was no atheist, but a man of unusual and telling literary ability, as may be learned from the article on him at p. 136 of *Ency. Brit.*, Vol. XVIII. From this article it is clear he played a very important part in the foundation of American independence, for when the leaders of the movement were dispirited he stirred up the country with his pamphlet *Common-sense*, which is described as " a most telling array of arguments for separation and for the establishment of a republic, conveyed in strong, direct, unqualified language." Later, by the light of camp fires, he composed *The Crisis*, which was read to Washington's army, " and seems to have had a wonderful effect in restoring a courage that was considerably impaired by defeat. Its opening words, ' These are the times that try men's souls,' became a battle cry." Of *The Rights of Man*, of which he was the author, *Ency Brit.* says, " Those who know the book only by hearsay as the work of a furious incendiary would be surprised at the dignity, force, and temperance of the style," and of the *Age of Reason* the same article says, " Intermixed with coarse, unceremonious ridicule of what he considered superstition and bad faith are many passages of earnest and even lofty eloquence in favour of a pure morality founded on natural religion, fully justifying the bishop of Llandaff's saying : ' There is a philosophical sublimity in some of your ideas when

speaking of the Creator of the universe.' The work, in short, . . . represents the deism of the 18th century in the hands of a rough, ready, passionate controversialist."

That William Pitt, the first Earl of Chatham, died suddenly in the House of Lords

Once more it is to the careless disregard of facts by artistic people that we are indebted for the perpetuation, if not initiation of fallacies. There is a picture in the Houses of Parliament which has been, and will be, seen by thousands of people, and each one will be given an incorrect impression of the fact which it apparently professes to record, but probably from the artist's point of view the important thing is to produce a picture which will attract attention *to itself* and its painter, the facts being a secondary consideration.

The title borne by the picture is *Death of Chatham*, and he is represented in gorgeous robes, but, according to Mr. C. E. Clark, who certainly does *not* disregard facts, Chatham, " wrapped in flannels and supported on crutches came down to the House, where he delivered his great speech as Opposition leader in criticism of the Government policy with reference to the American War. On rising to speak a second time, he fell backwards in a fit. Having slightly recovered, he was removed to Hayes, where five weeks afterwards he died, April 2-May 11, 1778."—*More Mistakes We Make*, p. 129. *Ency. Brit.*, V., 444, agrees with this, though it does not mention the flannel and crutches. It may be said that to have represented the flannel and crutches would have spoiled the picture. The answer is : Don't choose an unsuitable subject.

That Tyndall was an Atheist

In 1854 a number of intellectual giants, including Faraday, Whewell and Tyndall, gave a set of lectures on education at the Royal Institution. These were edited, with an introduction by Sir Ray Lankester, K.C.B., F.R.S., and reprinted by Mr. William Heinemann in 1917 for the modest sum of one shilling—let no one say the purchasing power of money has fallen while such an intellectual feast may be bought for the price of a tooth-brush ! One of these lectures was by Prof. John Tyndall on " The Importance of the Study of Physics as a Branch of Education for all Classes." At p. 122 we find " As the nurse holds her glittering toy before the infant that

she would encourage to take its first step, so it would appear as if one of the ends of the Creator, in setting those shining things in heaven, was to woo the attention and excite the intellectual activity of his earth-born child." At p. 135, " To stand still, however, was not the plan of Him who made motion a condition of life, and, as if by His high arrangement, the steam engine appeared. . . I have regarded the question with reference to those mental qualities which God has distributed without reference to class." And at pp. 141 and 142, " The knowledge of the laws by which God's universe is sustained. . . To chasten this apparent chaos is a problem which man's Creator has set before him."

That James Watt, by experimenting with an Egg Cup or Spoon, and a Tea Kettle, arrived at his most important improvement of the Steam Engine, namely, the separate Condenser

Probably some people go further and say that the said experiment resulted in his *inventing* the steam engine. As he certainly did not invent the steam engine, this account would not be true. A well-known sporting journalist began his article in the *Daily Mail* of July 26, 1919, with the words, " A steaming kettle suggested the idea of the locomotive to young James Watt " ! ! Someone else once suggested that a shoemaker should stick to his last.

At p. 89 of Dr. Samuel Smiles' *Lives of Boulton and Watt* we learn that Watt's aunt, Mrs. Muirhead, said to him,". . you have not spoken a word, but taken off the lid of that kettle and put it on again, holding now a cup and now a silver spoon over the steam, watching how it rises from the spout, catching and counting the drops it falls into." Dr. Smiles thinks that Watt was idling, and this experiment had no connection with the invention of the separate condenser which was made many years after.

There are several variants of the anecdote :—

(1) Spoon and tea-kettle ; spoon used to condense the steam.

(2) Spoon and tea-kettle ; spoon used to close end of spout and so make the steam lift the lid of the kettle to test the " force of steam."

(3) Egg-cup and kettle to condense the steam.

There is a painting by Marcus Stone, R.A., which shows

Watt as a boy holding a spoon in the issuing steam, and a man and woman are also at the table. Both are looking on with evident interest and approval, which is *not* in accord with the usual story of the aunt! Neither the *Dic. of Nat. Biography* nor the 11th edition of *Ency. Brit.* mentions the kettle incident.

It may be pointed out in connection with variant No. (2) given above that some tea-kettles have a two lipped spout, and that steam could not be stopped from issuing from such a spout by a spoon or egg-cup. In *Ency. Brit.*, 9th ed., XXIV., 412, it is written, "Early in 1765, while walking on a Sunday afternoon in Glasgow Green, the idea flashed upon him that if the steam were condensed in a vessel distinct from the cylinder, it would be practicable to make the temperature of condensation low, and still keep the cylinder hot." This indirectly refutes the popular idea. At p. 15 of his *Steam-engine and other Heat Engines* (1899), Sir J. A. Ewing, M.A., B.Sc., F.R.S., has the following: when reading it it should be remembered that Watt was 26 years old in 1762:—

"Watt's narrative of his invention. In a note appended to the article 'Steam-Engine' in Robinson's *System of Mechanical Philosophy* (1822) Watt has given the following account of the experiments and reflections which led up to his first patent. This narrative is of so particular interest that no apology need be made for reproducing it in full:—

"'My attention was first directed in the year 1759 to the subject of steam-engines by the late Dr. Robinson himself, then a student in the University of Glasgow, and nearly of my own age. He at that time threw out the idea of applying the power of the steam-engine to the moving of wheel-carriages, and to other purposes, but the scheme was not matured, and was soon abandoned on his going abroad.

"'About the year 1761 or 1762 I tried some experiments on the force of steam, in a Papin's digester, and formed a species of steam-engine by fixing upon it a syringe one-third of an inch diameter, with a solid piston, and furnished also with a cock to admit the steam from the digester, or shut it off at pleasure, as well as to open a communication from the inside of the syringe to the open air by which the steam contained in the syringe might escape. When the communication between the digester and syringe was opened, the steam entered the syringe, and by its action upon the piston raised a considerable weight (15 lb.) with which it was loaded.'"

That James Watt invented the Engine Governor known by his name

At p. 57 of the *Dic. of Nat. Biog., sub* " Watt," it will be found stated that Watt did *not* invent the so-called Watt governor.

That Sir Charles Wheatstone, F.R.S., invented the Wheatstone Bridge

A versatile research worker, he invented the stereoscope and concertina, and many other things, but *not*, curiously enough, the instrument for measuring electrical resistances known as the Wheatstone bridge, this having been invented by Christie and brought into use and notice by Wheatstone.

That Edison invented the Telephone

It was invented in 1876 by Alexander Graham Bell, who was born at Edinburgh on Mar. 3, 1847, and who went to the United States in 1872, where apparently he became naturalised, as the *Cyclo. of Names* speaks of him as an American. The outline of a " bell " on some of the notices indicating public telephones is in reference to the inventor's name.

Prof. Silvanus P. Thompson, D.Sc., F.R.S., apparently claimed the invention for Philipp Reis, as he describes him as " Inventor of the Telephone " in a *Biographical Sketch* he published of Reis in 1883, " His fundamental idea—the interruption of the current—was a fatal mistake which was not at the time properly understood." *Ency. Brit.* XXIII., 128. Berliner, Edison, Hughes, Elisha Gray and others all had a hand in the invention, but, as *Ency. Brit.* goes on to say, " The next worker [after Reis] at the telephone, and the one to whom the great commercial importance of the instrument is due, was Bell."

That Sir Francis Bacon was the first person to publish the true Principles of Aeronautics

" Some writers have stated that Francis Bacon first published the true principles of aeronautics. This assertion we cannot help noticing, because it really has no foundation except in the propensity, fostered by indolence, which would gladly refer all discoveries ever made to a few great names. They mistake, indeed, the character of Bacon who seek to represent him as an inventor. His claim to immortality

rests chiefly on the profound and comprehensive views which he took of the bearings of the different parts of human knowledge."—James Glaisher, F.R.S., *Ency. Brit.*, I., 187.

That Roger Bacon was a Student at Merton or Brazenose College, Oxford

" Roger Bacon completed his studies at Oxford, though not, as current traditions assert, at Merton or Brazenose, neither of these colleges having then been founded. . .

" Very little is known of Bacon's life at Oxford ; it is said he took orders in 1233, and this is not improbable."—Robt. Adamson, M.A., *Ency. Brit.*, III., 219.

That Roger Bacon invented Gunpowder

" Bacon's fame in popular estimation has always rested on his mechanical discoveries. Careful research has shown that very little in this department can with accuracy be ascribed to him. He certainly describes a method of constructing a telescope, but not so as to lead one to conclude that he was in possession of that instrument. Gunpowder, the invention of which has been claimed for him on the ground of a passage in his works, which, fairly interpreted, at once disposes of any such claim, was already known to the Arabs." —R. Adamson, M.A., *Ency. Brit.*, III., 221d.

That Sir Joseph Banks, P.R.S., left all his Botanic work to his Secretaries and Curators, Solander and Dryander

The centenary of Sir Joseph Banks was commemorated in 1920 by the Linnean Society. The third paper was read by Mr. James Britten, who showed that the popular belief that Banks left all his botanic work to his secretaries and curators, Solander and Dryander, was a mistaken one, and that Banks displayed great botanic acquirements. His magnificent library and herbarium were at the service of other workers, and after his death were bequeathed to the British Museum. He was President of the Royal Society for 42 years.—*Nature*, June 24, 1920, p. 530.

That Byron was the Author of " Now Barabbas was a Publisher "

According to Dr. Samuel Smiles (*Memoir of John Murray*) Thomas Campbell was the author. *Notes and Queries*, 12 S.I.,

120, of Feb. 5, 1916, confirms this, and refers to Mr. Murray's letter at 11 S. II., 92.

That Lord Byron had a Club Foot

"Byron's Lameness (12 S. xi. 272, 316).—In 1915, Mr. James Ward, a Nottingham antiquarian (*sic*), printed, for private circulation, some correspondence which had occurred in 1897 between Mr. G. O. Napier, author of 'Homes and Haunts of Byron,' Mr. White, librarian of Trinity College, Cambridge, and himself relating to the differing statements of Mr. Hobhouse and the Countess Guiccioli as to which foot (leg) of Byron's was deformed, the former stating that it was the right, and the latter the left. The Countess, in her 'Recollections of Byron,' quotes a statement by Swift, a Southwell bootmaker, who had made boots for Byron, 1805-7, to the effect that Byron had not a club foot, but that the left leg was an inch and a half shorter than the right, and that it was the ankle that was deformed. The Countess further wrote that Mrs. Wildman of Newstead had presented to the Naturalists' Society of Nottingham Byron's boot and shoe *trees*. They are not *trees* but *lasts*, and they were given to the Society by W. Jones of Southwell, as appears from a paper attached to them :—

"'These are lasts upon which Lord Byron's shoes were made by Mr. W. Swift of Southwell. The last pair made upon them was on May the seventh, 1807. Contributed by W. Jones, Southwell. Stamped on last : Chaulk, Prince's St., Drury Lane. Stamped on the block : W. Swift. Both lasts are the same length.'

"The lasts are now in the Nottingham Castle Art Museum. They measure 9⅞in. in length, and are rather narrow. The conclusion arrived at by Mr. White and others was that the lasts proved beyond a doubt that Byron never had a club foot ; that Hobhouse was wrong and the Countess right ; it was the left leg that was deformed (shorter)."—C. J. P. *Notes and Queries*, Oct. 21, 1922, p. 339.

That Weston invented the suspended Centrifugal Machines used for Drying Clothes, Sugar, etc.

These machines are also called "hydro-extractors." There is a good, illustrated, chapter (xx., pp. 407-27) on them in *Cane Sugar*, by Noel Deerr, 2nd ed., 1921.

At p. 409 it is stated, " His (Weston's) patent did not claim suspension, but only the special means of suspension, and he is in no wise to be considered the inventor of the suspended machine, the credit for which is due to Bessemer,* and to whose design the latest types of solid spindle machines tend to revert."

That Claverhouse, Viscount Dundee, was killed by a Silver Bullet at the Battle of Killiecrankie

There is an old Celtic superstition that only a bullet made of silver can slay an evil spirit. There is also a tradition that all famous dead shots with a rifle, who " could snuff a candle by firing at it at 100 or more yards without putting it out," used silver bullets when performing such incredible feats. Now, Claverhouse was said to have entered into a legal compact with the Devil, and Wodrow, the chief chronicler of the Covenanters, informs us that Claverhouse kept himself, in a drunken and lascivious age, clean alike from wine and women, that he might do the Devil's work with more steadfast efficiency ! Consequently the combination of these two beliefs was bound to lead to the stronger belief that only a silver bullet could have killed Claverhouse.

Profs. Oman and Ransome, and *Ency. Brit.*, do not refer to the silver bullet tradition.

That Daniel Defoe had his Ears cut off as a Punishment for Libel

Prof. Edward Bensly dealt with this in *Notes and Queries* of Feb. 5, 1921, p. 118 :—

" Daniel Defoe in the Pillory (12 S. viii. 12, 78).—In spite of the familiar line in the ' Dunciad ' (ii. 147) there can be no doubt that Defoe did not suffer mutilation. Mr. W. J. Courthope, commenting on this passage, Pope's ' Works,' Vol. IV., p. 329, writes :—

" ' Daniel Defoe never lost his ears, though Pope, by comparing him to Prynne in Book I., 103, seems to insist on the fact.'

" The writer of the article on Defoe in *The Encyclopædia Britannica*, says that Pope ' knew that the sentence to the pillory had long ceased to entail the loss of ears.'

" Defoe had been found guilty of a seditious libel, the

* Sir Henry Bessemer, F.R.S., of " Steel Converter " fame

performance in question being his pamphlet 'The Shortest Way with the Dissenters.'"

That Dick Turpin stole the Plate of St. Mary's Church, Walthamstow

The following is from *Notes and Queries* of Mar., 1920, p. 57 :—

"WALTHAMSTOW AND DICK TURPIN.

"Mr. Edwin Freshfield mentions the tradition that the plate of St. Mary's Church was taken and held to ransom by the notorious Whitechapel butcher-boy and highwayman, Dick Turpin ; but so far as the Walthamstow Antiquarian Society knows the parish records have no reference to this incident ; and Mr. Bosworth believes there is no foundation for the tradition. It is in fact a common form of the myths which have grown up around the personality of one who was a specially vulgar and brutal rogue without a spark of chivalry or gallantry in him."

That Gonsales de Velosa invented the Three-roll Sugar Cane Mill

"The first mill of three rollers was made in Sicily in 1449 by Pietro Speciale. This type of mill was used by Gonsales de Velosa in 1506 in the first factory erected in the New World, at Rio Nigue in San Domingo ; and by old writers is often described as of his invention."—Noël Deerr, p. 198, *Cane Sugar,* 1921.

That the Gregorian Calendar was calculated by Pope Gregory XIII.

"The author of the system adopted by Gregory was Aloysius Lilius, or Luigi Lilio Ghiraldi, a learned astronomer and physician of Naples, who died, however, before its introduction ; but the individual who most contributed to give the ecclesiastical calendar its present form, and who was charged with all the calculations necessary for its verification, was Clavius, by whom it was completely developed and explained in a great folio treatise of 800 pp., published in 1603."—*Ency. Brit.*, IV., p. 671.

That Othello was a Black Man

"*Run from her guardage to the sooty bosom*
Of such a thing as thou."—Othello, I., ii., 70.

"*To the health of black Othello.*"—Othello, II., iii., 30.

" The Moors are a white race, tanned a trifle by the sun, of course, but most certainly white, so that Othello could not have been black, or, if he was, he was not a Moor."—C. E. Clark, *More Mistakes We Make*, p. 120.

" It appears that Shakespeare was not mistaken merely in thinking that Moors were black men, but that Othello was not even a Moor after all. Captain Vincent Trowbridge has discovered that he was a distinguished Venetian soldier called Maurizio Othello, who migrated to Hungary, where he was known as Othello Mor, Mor being the Hungarian for Maurizio, and following the surname according to the national usage. Hence the error."—*University Correspondent*, Nov. 1, 1922, p. 166.

Mungo Park, a Scotsman, when sun-burnt by travelling in Nigeria in 1797 was frequently taken for a Moor. This supports Mr. Clark.

That Senior Wranglers never make a Mark in Later Life

The legal correspondent of the *Daily Telegraph* wrote in that paper on Mar. 10, 1921, on the occasion of Lord Moulton's death, " It is often asked what becomes of the Senior Wranglers and Senior Classics, and the first-class men of Oxford. Cambridge, at all events, need not fear the challenge. The Mathematical Tripos dates from 1747-8, and a goodly number of those who have headed it have found their way to the Bench. The first was Littledale, who was Senior Wrangler in 1787, a really distinguished judge, who, asked what his politics were, replied, " My politics are the politics of a special pleader." The next was Chief Baron Pollock, in 1806. Then for three successive years the Tripos was headed by future judges. Bickersteth (1808) became Lord Langdale and Master of the Rolls, and was offered the Woolsack. In the following year came Alderson, Baron of the Exchequer—the late Lord Salisbury's father-in-law. In 1810 the Senior Wrangler was Maule, the famous wit, to whose pungent irony on one occasion is ascribed the origin of the Divorce Act, 1857. Half a century was to elapse before another appeared, in 1860, in the person of Sir James Stirling, who was a Chancery judge, and then Lord Justice. Then came Sir Robert Romer, in 1863, whose career was similar to that of Sir James Stirling. Finally in 1868, came Moulton, whose intellectual powers were inferior to those of none in the list. The Senior Wranglership has in recent years, like the High Court of Chancery itself, in

which three of the mathematical heroes mentioned above practised, become a thing of the past."

Lord Moulton was an F.R.S. The late Lord Rayleigh (3rd Baron) was the Senior Wrangler and Smith's Prizeman in 1865, and became President of the Roy. Soc. There must be many such cases.

That "Is thy servant a dog that he should do this thing?" was Sydney Smith's reply to Landseer when the latter asked him to sit for his Portrait

"CREDIT WHERE CREDIT IS DUE.

"The famous answer attributed to Sydney Smith, when Landseer asked to paint him: 'Is thy servant a dog that he should do this thing?' was really invented by Lockhart. Landseer met Sydney Smith in the Park, and said to him: 'You have heard the story they are telling about us?' 'Oh, yes,' was the reply, 'I don't mean to disclaim it if you don't.'" —*T.P.'s Weekly*, April 24, 1908.

It was a witty use of a quotation from the *Bible*, II. Kings, viii., 13.

That Mr. W. T. Stead correctly Predicted how he would Die

"MR. STEAD'S PRESENTIMENT.

"Talking about clairvoyance with a special correspondent of the *Daily Mail* in Constantinople last October, Mr. W. T. Stead said, 'I know perfectly well how I shall die. It has been revealed to me. I shall go to prison twice more before I die and I shall end by being kicked to death in the streets of London. This makes my mind quite easy when I travel, and I never insure myself against any risks of any kind.'"—*Daily Mail*, April 17, 1912.

He was drowned when the s.s. *Titanic* foundered.

Speaking of Mr. Stead in *My Own Times*, Lady Dorothy Nevill, p. 29, says, "He was a large hearted and generous man, in fact, in some ways, he resembled a mediæval saint. What a pity that Julia or some other spook did not warn him against setting out on his fatal journey. . . . his own prediction as to his end . . . being thus completely falsified."

That "Sweeney Todd" was a real person

"Mr. Frank Jay may be quite certain that the 'Sweeney Todd' traditions of the wine-cellar in Johnson's Court are

bogus, for the very good reason that there never was such a person as 'Sweeney Todd, the demon barber of Fleet St.' Mr. H. C. Porter completely exploded this popular and widespread myth in the columns of *Notes and Queries* in 1902 (I. S., IX., 345)."—R. S. Pengelly, p. 378, *Notes and Queries*, May 13, 1922.

That Peg Woffington founded certain Almshouses at Teddington

"A celebrated Irish actress, the daughter of a bricklayer. . . . The 'finish' of the male characters she assumed made the fortunes of the theatres where she played. She lived for some time with Garrick and Macklin at No. 6, Bow St., London. . . . She attempted to atone for her lack of moral character by her charities, though the almshouses at Teddington, said to have been founded by her, are of much earlier date."—*Century Cyclo. of Names*, p. 1068.

LITERATURE

That the Enigma on the letter H, beginning " 'Twas in Heaven pronounced, 'twas muttered in Hell," was written by Lord Byron

It was written by Miss Catherine M. Fanshawe, as you will see by p. 83 of *Inquire Within*, 98th edition, 1901.

" The Byron legend dies hard ; indeed, it will probably survive in spite of absolutely definite refutation. In ' A Family Chronicle '—a volume which I noticed on its publication—there is a contemporary record which, if further proof were needed, puts the matter beyond all dispute. A copy of the riddle was amongst Lady Dacre's papers, with this note attached : ' Found among my old hoards, Feb. 3, 1846, Catherine Fanshawe's " Riddle on the Letter H," in her own handwriting, given to me forty years ago, at least, and before Lord Byron was heard of."—*T.P.'s Weekly*, March 27, 1908.

That the 7th, 8th, 9th, 10th, and 13th Books of Euclid are not extant

We believe that some of those who are of this opinion think that the Books in question were destroyed when the library at Alexandria was burnt ; others that Mrs. Euclid burned them ! The author has had a very old and complete edition of Euclid's works in his hands, and from this he transcribed the following :

" The Elements
of Geometrie
of the most auncient
Philosopher
Euclide
of Megara.

Faithfully (now first) translated into the Englishe toung, by H. Billingsley, Citizen of London."

There is a long preface by M. I. Dee, which he thus curiously ends :—

" Written at my poore House
At Mortlake.
Anno 1570. February 9."

The 7th, 8th and 9th Books treat of numbers.

" In this tenth Booke doth *Euclide* entreat of lines and other magnitudes rationall & irrationall, but chiefly of irrationall magnitudes, commensurable & incommensurable."

The 11th and 12th Books treat of solid geometry.

" In this Thirteenth Booke are set forth certayne most wonderfull & excellent passions of a lyne devided by an extreme & mean proportion." It also deals with solid geometry.

There are also Books numbered 14 and 15, treating of geometry in general, but these are ascribed to *Appollonius* or *Hypsicles*.

Another complete edition which we have seen is in Greek with a Latin translation. This also gives the 14th and 15th Books, and its title-page is as under :—

" EUCLIDIS OPERA OMNIA
ediderunt
I. L. Heiberg et H. Menge
LIPSAE.
in aedibus B.G. Teubneri
MDCCCLXXXIII.

Isaac Barrow published in 1655 an edition of *Euclid's Elements* containing fifteen books entire. Vide *Nature*, July 8, 1897, and *Ency. Brit.*

That L.L.A. (St. Andrews) is a degree

L.L.A. on being expanded becomes Lady Literate in Arts, and is not a degree, but a certificate about equal to the Cambridge Higher Local Certificate. The University of St. Andrews also grants the degree of M.A.

That the Exhortation, " Little Children, love ye one another," occurs in the Bible

The explanation of this mistake is practically the same as that concerning " God tempers the wind to the shorn lamb " (*q.v.*).

It has been ascribed to St. John in his old age. *Vide* Eusebius.

That Baron Münchhausen was the Author of the Book entitled " The Adventures of Baron Munchausen "

On referring to " Raspe, Rudolph Erich," in Haydn's *Dic. of Biog.*, we find he was born in 1737, that he published anonymously *The Adventures of Baron Munchausen* in 1786, and that

he died in 1794 ; while the same authority tells us that Jerome Carl Friederich Münchhausen (note the two h's in the name, while only one is given in the title of the book) was a German officer, born 1720, died 1797, whose boasting narrative of his exploits, intermingled with fables, was published in English by Raspe.

Dr. Brewer, *Dic. of Phrase and Fable*, adds that Baron Münchhausen was noted for his marvellous stories, and that the book was a satire either on Baron de Tott, or on Bruce, whose *Travels in Abyssinia* were looked upon as mythical when they first appeared.

" The author is now ascertained to have been Rudolph Eric Raspe, a learned and scientific German, who died in 1794, at Mucross, in the south of Ireland, while conducting some mining operations there. He was born in Hanover in 1737, became a professor of archæology, Keeper of the National Library, and a Councillor ; but he disgraced himself, and escaped to England. Raspe was a geologist and a mineralogist, and a paper of his was read to the Royal Society in 1769. He got into difficulties, but was befriended by Horace Walpole, who speaks of him as ' a Dutch savant.' He was employed in certain mines in Cornwall, and while storemaster at Dalcoath mines he wrote and published his *Travels of Baron Munchausen*. . . Raspe is said to have published the *Travels* . . . as a satire or parody on the travels of the famous Baron de Tott ; but Munchausen was really in the habit of relating the adventures sanctioned by the authority of his mendacious name as having positively occurred to him ; and he is supposed to have, at length, believed what he related." —John Timbs, F.S.A., *Notabilia*, p. 344.

" . . . This book appears to have been first published in a restricted form by one Kearsley, a bookseller in Fleet Street, in 1786 ; a few years afterwards it was reprinted, with a considerable addition of palpably inferior matter, by H. D. Symonds, of Paternoster Row. The author's name was not given, and it has, till a very recent date, remained little or not at all known. . . "

Book of Days, Vol. II., p. 85.

That " The Vision of Piers the Ploughman " was written by one Piers

Dr. Brewer says the author is *supposed* to be Robert or William Langland, while Haydn's *Dic. of Biog.* says, " Robt.

or Will. Langeland is said to have finished the *Vision of Piers Ploughman* in 1366," that it was not *printed* till 1550, and that the author died about 1370. The Rev. Stopford Brooke, M.A., in his primer of *English Literature*, p. 38 *et seq.*, gives a full account of the book, and says: "Its author, William Langland, though we are not certain of his *surname*, was born about 1332," and that the text of it was probably written in the country in 1362."

Hence it ap*pears* it was not Piers!

That the Mot "The Most Learned Fool in Christendom" is due to Henry IV. of France

The first of the set of "Extra Prize Answers" in the *Journal of Education* for January, 1897, was the above, and it is pointed out that the expression was first applied by Sully to James I. of England, and that Henry IV. of France is sometimes credited with its authorship.

That Louis XVIII. of France was the Author of the Mot, 'Il n'y a qu'un Français de Plus'

No. 7 of the "Extra Prize Answers" in the *Journal of Education* for January, 1897, explained that the saying was fathered on Louis on the occasion of his restoration in 1814, and that the inventor of it was Beugnot, the Minister of Police.

That Æsop wrote "Æsop's Fables"

"Æsop, *b.c.* 619, *d.* 564 B.C. He is supposed to have been a Phrygian . . . . It should, however, be remembered that in most of the popular collections of fables which go under Æsop's name a large proportion are spurious and perhaps all have been more or less modified by the translator or compiler."—J. Thomas, A.M., M.D., *Universal Dic. of Biog. and Mythology*.

"None of Æsop's works are extant. The popular stories regarding him are derived from a life prefixed to a book of fables purporting to be his, collected by Maimus Planudes, a monk of the 14th century, in which he is represented as a monster of ugliness and deformity, a notion utterly without foundation and doubtless intended to heighten his wit by the contrast . . . . Whether Æsop left any written fables has been more justly disputed, and Bentley inclines to the

negative . . . . it is, however, certain that fables bearing Æsop's name were popular at Athens during the most brilliant period of its history; though the discrepancies of authors in quoting the same fables seem in favour of Bentley's hypothesis . . . . The fables now extant in prose under Æsop's name are entirely spurious, as is proved by Bentley in his *Dissertation on the Fables of Æsop*, and have been assigned an oriental origin."—*Ency. Brit.*, Vol. I., p. 211.

"Babrius (first or second century A.D.), versified in simple language the fables going under the name of Æsop. The latter is a somewhat mythical figure, placed in the sixth century B.C., and whose fables must have been largely traditional. Babrius is not without merit as a writer, and his work has been a school-book in all ages."—H. J. W. Tillyard, M.A., *Greek Literature*, p. 84.

See also ' 'Babrius' in the *Harms. Ency.*

That the Apostles' Creed is of Apostolic Origin

There seems no doubt it is *not* of such origin, but there *is* a doubt as to even the exact century in which it took its present form. *Ency. Brit.* says:—"The tradition which ascribes it to the Apostles' themselves has no authority, and does not reach beyond the fifth century, if it can be carried so far. The definite source of the legend is supposed to be two sermons spuriously attributed to St. Augustine, and found in the appendix to his works." The *Century Dictionary* says:—"The creed has been preserved in substantially its present form from the close of the fourth century, but in its precise wording from about A.D. 500."

Pannell's Reference Book states that "the creed was probably embodied in its present form in the eighth century, though it has been traced, with some variations, back to the fourth century."

"It is in the writings of the same historian, Rufinus, who recorded the prevalence of the lying spirit amongst the fathers, that we meet with the story that the Apostles had jointly composed the document known to us as the Apostles' Creed; each Apostle contributing one of its twelve clauses. Rufinus says that this opinion cannot be traced earlier than the middle of the fourth century. A modern scholar attributes that Creed to the church of Aquileia. It appears to have been developed from the 'symbol' or confession required of converts on their baptism, at Rome. It certainly possesses

no Apostolic warrant."—Silvanus P. Thompson, D.Sc., F.R.S., in *The Quest for Truth*, pp. 61 and 62.

That the Athanasian Creed was written by Bishop Athanasius

Dr. Brewer states that it was so named because it embodies the opinions of Bishop Athanasius respecting the Trinity, and that it was compiled in the fifth century by Hilary, Bishop of Arles. *Pannell's Reference Book*, on the other hand, says it was probably drawn up in the sixth century, *i.e.*, about two centuries after the death of Athanasius. The *Cent. Dict.* states that the authorship is unknown, and that it used formerly to be ascribed to Athanasius.

Mr. C. E. Clark p. 15, *Mistakes We Make*, says it was not written by Athanasius, " though it correctly expresses his doctrines. The original was written in Latin, not, as it would have been, in Greek, had Athanasius written it ; in fact it was entirely unknown in the Greek Church up to the 10th century, and even in Latin did not appear before the end of the 8th century, whereas Athanasius lived in the fourth."

Harms. Ency. (Under " Creeds ") says, " The *Athanasian Creed* is not the work of Athanasius. It was formerly attributed to the end of the 8th century, but is now assigned, on the strength of quotations in commentaries, of councils, and of other references, to somewhere in the fifth century."

Vide also *The Nicene and Apostles' Creeds* (1875) by C. A. Swainson.

That the Name " Mount Calvary " occurs in the Bible

The only place where the word " Calvary " is used is in *St. Luke* XXIII., 33, where we read, " . . . to the *place* which is called Calvary " ; while the Revised Version has it, " . . . . to the place which is called The skull." The Hebrew word is " golgotha," meaning a " place of skulls."

That all words ending in " ile " or " ine " should be pronounced with the " i " long

This is an error which anyone can easily look up for himself when once it is pointed out. Common examples are fragile, agile, turbine, profile, and projectile, in all of which the " i " should have its short sound.

That the term " Uncut," used by Publishers and Booksellers, means that the Leaves are United at their Edges

When the leaves of a book are united at their edges,

owing to the folding of the sheets of paper on which the book is printed, it is said to be *unopened;* but when a book is *uncut* the leaves vary slightly in width, so that their edges do not form a continuous line, and this is because the book was not put in a cutting machine (guillotine).

The terms page and leaf are often used as if they were synonyms, but there ought to be no confusion here; if you take a single thickness of paper and tear it out of a book, you tear out one *leaf*, each side of which is a *page;* that is, there are two pages to every leaf. The German who had a lending library was well acquainted with these two terms. When the books were brought back he used to examine them carefully to see whether any damage had been done. On one occasion he found a hole in p. 19, and turning the leaf over he said, "And see here, there is another in p. 20," and proceeded to charge for both!

That Joe Miller was an inveterate Jester and that he wrote "Joe Miller's Jest Book"

There is at least one other jest book besides Joe Miller's. It was "selected and arranged" by Mark Lemon, the founder of *Punch.* In the preface to this book Mark Lemon says, ". . . therefore we may opine that Yorick's flashes of merriment . . . were transported hither by the Danish invaders and descended to Wamba, Will Somers, Killigrew and other accredited jesters, until Mr. Joseph Miller reiterated many of them over his pipe and tankard when seated with his delighted auditory at the 'Black Jack' in Clare Market.

"Modern research has been busy with honest Joe's fame, decreeing the collection of his jests to Captain Mottley, who wrote short-lived plays in the time of the first and second Georges."

Miller, according to the reviewer of the first edition of *Popular Fallacies* in the *Observer* of Oct. 10, 1907, was "an actor of preternatural solemnity."

The *Cent. Cyclo. of Names* says: "Miller, Joseph. Born, 1684; died at London, 1738. An English comedian. The collection of jests known as 'Joe Miller's Jests' appeared originally in 1739 as 'Joe Miller's Jest Book, or the Wit's Vade Mecum.' It was made by John Mottley, and received its name unwarrantably from Joseph Miller, who is popularly said never to have made a joke in his life, and could neither

read nor write. It has been many times enlarged and reprinted. Any stale jest is now known as a ' Joe Miller,' from the fact that it is supposed to have at some time emanated from this source."

Prof. Ernest Weekley, M.A., at p. 68 of his *Romance of Words* (1912), says, " English *gest* or *jest* is common in the 16th and 17th centuries in the sense of act, deed, and *jest*-book meant a story-book. As the favourite story-books were merry tales, the word gradually acquired its present meaning.'

Mr. Donald Gunn's research confirms that Mottley was the author.

Vide p. 59, *A Book of Famous Wits*, by Walter Jerrold.

That " One touch of Nature makes the whole world kin " refers to sympathy

Miss Steele-Hutton, M.A., says few quotations are more misused than this one, for Shakespeare had no intention of using the sentence with the meaning that is attached to it by those who quote him.

The following paragraphs appeared in *T.P.'s Weekly*, of May 1 and 15, 1908 :—

" Once more the misuse of this Shakespearean line, ' One touch of Nature makes the whole world kin,' is pointed out by a correspondent of the *Spectator*. That journal had remarked that the line ' throws more light than any treatise upon the difficult question of sympathy.' But the correspondent recalls the context :

' One touch of nature makes the whole world kin ;
That all with one consent praise new-born gawds,
Though they are made and moulded of things past,
And give to dust, that is a little gilt,
More laud than [to] gilt o'er-dusted.'

This obviously throws no light on the subject of sympathy."

" Basil Bell " writes, " Apropos of your paragraph upon the misuse of the line, ' One touch of Nature makes the whole world kin,' it may interest your readers to know that even Walter Pater was guilty of this error. I have recently come across this passage in his essay on ' Shakespeare's English Kings ', ' One after another, they seem to lie composed in Shakespeare's embalming pages, with just that touch of Nature about them, making the whole world akin.' "

The Shakespearean quotation is from *Troilus and Cressida*, Act III., iii., 174.

Mr. C. E. Clark says, "Whenever quoted it invariably deviates from the original meaning. The 'touch of Nature' is now used to mean a touch of joy, or the wound of sorrow, or, indeed, any susceptibility that opens a source of sympathy to all men. But all of this was far from the mind of Shakespeare. What he intended to depict was foolish humanity united in praising everything that happened to be merely new-fashioned."

That "Hannah Glasse" was not the authoress of "Mrs. Glasse's Art of Cookery Made Plain and Easy" (1747)

Mr. C. E. Clark for once seems to be in error, for he states (*The Mistakes We Make*, p. 14), "'Hannah Glasse' is as much a myth as was Sairey Gamp's Mrs. Harris. The real compiler, as Dilly the publisher told Johnson, was Dr. John Hill." He goes on to say, "Nevertheless, the alleged Hannah has been often treated as a real individual, as, for instance, in an American publication in the writer's possession, wherein it is stated: 'Mrs. Glasse wrote other books on similar subjects.'" Brewer, too (*Dic. of Phrase and Fable*), states that Dr. John Hill was the author; he gives the title as *The Cook's Oracle*.

The *Cyclo. of Names* says its authorship was at one time attributed to Dr. John Hill, and the *Harms. Ency.* says, "Her works were falsely ascribed to Dr. John Hill."

The following appeared at p. 4 of the catalogue of second-hand books published by P. J. and A. E. Dobell, of 77, Charing Cross Road, London, W.C., Sept., 1915:—

"The Famous Cookery Book.

"Glasse's (Mrs.) The Art of Cookery, made plain and easy, which far exceeds anything of the kind ever yet published, by a lady (Mrs. Glasse), the first edition, exceedingly rare, folio, old half calf, *binding worn, some leaves stained, the first four leaves and last two leaves slightly defective*, £8 8s.

"*Printed for the Author and sold at Mrs. Ashburn's, 1747.*"

We may end with a quotation from *Leaves from the Note-books of Lady Dorothy Nevill*, p. 187, "Other rarities in this (Lord Carnarvon's) most careful collection of scarce and beautiful books are the tallest known copy of that rarest of Elzevirs, 'Le pastissier François,' and a first edition of the *Art of Cookery*, with H. Glasse, the autograph of Mrs. Glasse, written on the title page. The well-known remark, 'First catch your hare,' does not occur in the first edition."

That Dick Turpin rode from London to York within twenty hours and that he did so on a horse named "Black Bess"

At p. 17 of *The Romance of Engineering*, by H. Frith, we read, "Dick Turpin, whom Ainsworth has elevated into a hero, never rode to York as described; he was a mean robber, who, with his gang, haunted Epping, or other convenient spots, and plundered the weakest. Whitney was another 'hero,' also a butcher, as was Turpin."

Mr. C. E. Clark deals with this fallacy at p. 160 of *The Mistakes We Make*, and says, "The newspapers of the day being silent on all points but Turpin's contemptible meanness."

From the *Cyclo. of Names* we quote, "Dick Turpin. A notorious English highwayman, who was executed in 1739. The popular account of his famous ride to York on his mare 'Black Bess' is not mentioned in the 'Newgate Calendar,' and in its original form is said to have been written by Maginn."

The *Harms. Ency.* says, "The famous ride from London to York, generally attributed to Turpin, was accomplished in all probability by another highwayman, Nevison ('Nicks'). who, having committed a robbery at Gad's Hill (Kent) at 4 a.m., appeared in York that same evening at 7.45 p.m., thereby establishing an *alibi*. Turpin was hanged at York."

The *Dict. of Nat. Bio.* states that the story of the ride is a legend, and *Chamb. Ency.* also refutes the story.

"We know that famous mare ('Black Bess') to have been entirely the figment of Harrison Ainsworth's imagination."—Chas. G. Harper, at p. 324, *Old Inns of England*, 1906.

That "Lord Bacon" is the correct title of the famous Scholar and essayist

As an illustration of how firmly this mistake is established it may be mentioned that on Sept. 18, 1909, the author saw a label accompanying a modern book in the MSS. room of the Victoria and Albert Museum (South Kensington) bearing the words, "Francis, Lord Bacon," and he also saw a book of which the title page was:—"*Of Gardens.* An Essay by Francis Lord Bacon. London (Eragny Press), 1902."

Walter Jerrold, in his chatty *Autolycus of the Bookstalls* (v. 6), points out this error in quoting the title-page of one of Bacon's works: "*The Essays or Counsels, Civil and Moral*, of Sir Francis Bacon, Lord Verulam, Viscount

St. Alban, with a Table of the Colours of Good and Evil. Whereunto is added the Wisdom of the Ancients; enlarged by the Honourable Author himself; and now more exactly published" (1673). The error, according to Walter Jerrold, was started by Macaulay. The author has a copy of the same work, with exactly the same title-page, except for the addition, "*London*, Printed by *Thomas Ratcliffe* and *Tho. Daniel, for Humphrey Robinson* at the three Pigeons in St. Paul's Churchyard, 1668."

Sir Thos. Browne (*Vulgar Errors*, Chap. VIII.), writing in 1646 (*i.e.*, only 20 years after the death of Bacon), refers to "the learned Lord Verulam."

The *Cyclo. of Names* says, "commonly but incorrectly called *Lord Bacon*."

During March, April and May, 1910, several letters appeared in *T.P.'s Weekly* concerning Bacon's titles.

Bacon was for a time Lord Chancellor, which may be one cause of the error.

At p. 487 of *Notes and Queries* of June 17, 1916, the Editor had the following footnote:—

"Bacon's editor, Mr. James Spedding, contributed at 4 S. vi. 177 a very interesting article on this subject, in the course of which he said: 'There can be no doubt that "Lord Bacon" is a title which never belonged to him at any time of his life, either by law or custom . . . . When and by whom it was first given him, I do not know; but it seems to have become familiar by the middle of the seventeenth century.' Some instances are then cited, the first being 1654."

See also *Notes and Queries* II. S., xi., pp. 58 and 116 for the use of the title "Lord."

That a little Learning is a dangerous thing

> "*A little learning is a dangerous thing;*
> *Drink deep, or taste not the Pierian spring.*"—Pope.

Even if a little learning were a dangerous thing, it is better than a great deal of ignorance, as has often been pointed out. Dr. John Hopkinson, F.R.S., in his "James Forrest Lecture" at the Inst. of Civil Engs., May 3, 1894, said that if it be stated than an engineer with a little mathematical knowledge is dangerous, then it is also true that he would be more dangerous without any mathematical knowledge, and that

the cure for the danger in either case is *more* mathematical knowledge.

Read the reports of St. John Ambulance Association. They are most careful to point out that they train their students to render " First Aid," and first aid only, in the case of emergency, and in no circumstances must they try to usurp the surgeon's position; but even with this very elementary knowledge look at the immense amount of suffering and the number of lives the holders of their certificates have been able to save. [Particulars are given in their reports.] Far more true is it to say that the want of a little knowledge often gets people into a great deal of unnecessary trouble of one kind or another.

In an *Exposition of Vulgar and Common Errors*, by " Thomas Brown Redivivus " [*i.e.*, Miss Caroline Frances Cornwallis], 1845, at p. 51 we find this correction of the fallacy :—

" I know not whether when Mr. Pope wrote these words, he had himself felt that his small knowledge of Greek had betrayed him into some inaccuracies in his translation of *Homer*, and, therefore, he was in anger with his own ' little learning ' ; but this I do know, that the lines have been quoted largely to countenance an indolence that human nature is already too prone to, without the further aid of a popular poet. For, in good sooth, he that never beginneth can never end, and he who would have much learning, must begin his labours with little ; therefore I do hold this to be one of those fallacies which throw an obstacle in the way of improvement, and, therefore, ought to be removed from the path."

Sir John Lubbock, F.R.S., tells us he only knows of one instance in which " ignorance was bliss," and that was when some girl was very anxious to have the number 27 in a certain sweepstake. On this proving to be the winning number she was asked how it was she had thought that number would gain the prize, and she explained that " having dreamt of the number 7 for three nights in succession, and three times 7 being 27, she thought that must be the right number ! "

That the Mask worn by " the Man in the Iron Mask " was made of iron

In December, 1908, *The Man of the Mask*, by Mgr. Arthur Stapylton Barnes, was published and contains the statement

that, "The mask, which now [at Sainte-Marguerite] for the first time makes its appearance, was itself an indulgence, and not, as has so often been represented, an added torture. It was only a light construction of black velvet, with no iron of any kind about it, which could be put on when permission was given to go outside the cell, and which effectually prevented any possibility of his being recognised."

Harms. Ency. gives a long article on the subject and also states that the mask was made of black velvet.

That Chaucer was the Author of the "Court of Love"

"The country was, therefore, swarming with French tales, and its poetic imagination with the fancies and the fables of French chivalry. Finally, the influence of this French school is seen in the stories of Gower, and in the earlier poems of Chaucer. It lasted on, after Chaucer's death, in such poems as the *Court of Love*, written about 1470, and wrongly attributed to Chaucer."—The Rev. Stopford Brooke, M.A., in his *Primer of English Literature*, p. 33.

"*Court of Love.* A poem attributed to Chaucer by Stowe, and inserted in the 1561 edition, but believed to be of later origin."—*Cyclo. of Names.*

Geoffrey Chaucer was born in London about 1340 and died there on Oct. 25, 1400.

In the *Cyclo. of Names*, under "Chaucer," a list of his genuine works is given, and also a list of no fewer than 28 spurious works, among which is the *Court of Love*.

We always think of Chaucer as a poet, but like many authors he did *not* live on his royalties, and we learn with interest that in 1374 he was comptroller of the Customs on wool, skin and leather at the Port of London, and in 1389, at his own request, he was appointed Clerk of the King's Works at Westminster, and in 1390 at Windsor.

That Lord Lyttleton was the Author of "The History of England, in a Series of Letters from a Nobleman to his Son"

Oliver Goldsmith was the author.

Under "Goldsmith" in *Cham. Ency.* we find, "His next work was an anonymous *History of England, in a Series of Letters from a Nobleman to his Son*," while under "Lyttleton"

this work is not mentioned. It is said Lord Lyttleton never disowned the authorship, but (writes John Timbs—*Notabilia*, p. 327), " The History is, however, unquestionably, the work of Oliver Goldsmith."

That the legend of Bluebeard was devised by the Roman Catholics as a satire upon Henry VIII

The story is widely known in Western Europe, and the English version is a free translation of that given by Perrault in his *Contes* (1697). Greek, Tuscan, Icelandic, Esthonian, Gaelic, and Basque versions of the story are known, hence we find the writer in *Chamb. Ency.* stating that, " In the face of such a wide geographical range and self-evident antiquity it is as idle to look for an historical ' Bluebeard ' in Gilles de Laval, sire de Rais, who was executed in 1440 for his atrocious cruelties, as it would be to find him in our own Henry VIII., who was so unfortunate with his wives."

John Timbs, F.S.A., also refutes the story in his *Notabilia*, p. 345.

That Dr. Samuel Johnson was the Father of English Lexicography

A charming article on *Dictionaries of the English Language* appeared in the *Journal of the Royal Society of Arts* for Oct. 24, 1913, and if anybody will give himself the pleasure of reading that article he will not be likely to fall into the above error again. From this source we learn that Richard Huloet was the first to produce an English dictionary, and that it was issued in 1552. Robert Cawdrey compiled the first dictionary of the English language in which only English was used, Huloet having included Latin synonyms and definitions in French in his. Cotgrave was the next Englishman to publish a dictionary, which he did in 1611 under the title *A Bundle of Words*. Henry Cockeram published a dictionary in 1623. In 1656 Thomas Blount issued his famous *Glossographia* or English Dictionary with a long and quaint title. Nathan Bailey's dictionary appeared in 1720, and ran into no fewer than 26 editions. It contained far more words than Dr. Johnson's well-known work. It is probably not generally known that the Rev. John Wesley was also a lexicographer. He published his dictionary in 1753, and stated in the notice

to his readers: "The author assures you he thinks this is the best English Dictionary in the world . . . . many are the mistakes in all the other English dictionaries which I have yet seen, whereas I can truly say I know of none in this," from which we may conclude that modesty and Methodism do not always go together!

Johnson's celebrated dictionary appeared in 1755, and soon eclipsed that of Wesley, in spite of what the latter thought of it. Writing of Dr. Johnson, Dr. Vizetelly says, "This was the man who is sometimes, but inaccurately, styled the Father of English Lexicography. *Johnson's Dictionary*, published April 15, 1755—50,000 words—was based on Nathan Bailey's *Universal Etymological English Dictionary*."

That Olive Schreiner ("Ralph Iron") consulted George Meredith *re* her book "The Story of an African Farm," that he suggested certain changes, and that she made these in accordance with his suggestions

A dinner was given to Miss Olive Schreiner at the Lyceum Club, 128, Piccadilly, London, on Dec. 29, 1913, at which the author was present. To the great disappointment of those present we found that she had deputed a lady friend to speak on her behalf. Mr. Cunninghame Graham was particularly stirred, and expressed the disappointment of all in a powerful, vivacious and appealing manner, with the result that Miss Schreiner did say a very few words to us. Later Mr. W. L. George spoke, and very fortunately, as it turned out, he gave the popular story which is outlined in the above heading. While he was relating it I noticed Miss Schreiner getting restive, and when he sat down she at once asked the permission of the chair to correct a mis-statement, which she did very emphatically. She told us that George Meredith had never entered her house, and that she had never seen him before the MS. was accepted by Messrs. Chapman & Hall, but that after it had been accepted by them she called on them one day, and noticed a very remarkable looking man there, whom she learned was George Meredith, and that it was not until six months after this event that she heard that he was reader to Messrs. Chapman & Hall. On Miss Schreiner resuming her seat, Mr. George at once expressed his regret at having given a wrong story, and explained that he had read it in the *Pall Mall Gazette* and *Westminster Gazette* of that day.

As showing the persistency with which legends spread, even when denied by the best authorities, we wish to call special attention to the fact that this particular legend appeared in the *Westminster Gazette* in 1909, and was then corrected by Miss Schreiner. For all this it appeared in the same paper again in 1913 !

" Miss Schreiner, the well-known author of *The Story of an African Farm*, has written to the *Westminster Gazette* to correct an ancient and persistent error. The *Westminster*, in an article on Meredith, had retold the well-known story of the great novelist's assistance of Miss Schreiner when she was as yet unknown and he was reader to Messrs. Chapman & Hall :—

" ' When the MS. of *The Story of an African Farm* was submitted to Mr. Chapman by the young and utterly unknown authoress, he sent it to Mr. Meredith, who immediately divined the extraordinary power and pathos of the story. With the kindness which distinguished him he immediately wrote to " Ralph Iron " to come and see him. Miss Olive Schreiner sometimes recalls the first occasion on which she met Mr. Meredith, and describes with gratitude how valuable his counsels and advice were to her when revising her MS. for the printers.'

Such was the legend as related by the *Westminster*, and Miss Schreiner writes to say that the story is all wrong. The only communication that took place between the two writers was by word of mouth, and it had no reference to the *African Farm*."—*T.P.'s Weekly*, Aug. 6, 1909.

That the Proverb " Spare the Rod and Spoil the Child " occurs in the Bible, and that it was due to Solomon

The aphorism is due to Samuel Butler, and it occurs in his satirical poem, *Hudibras* (Part II., canto 1, line 844), published in 1663-4 :—

> " What medicine else can cure the fits
> Of lovers when they lose their wits ?
> Love is a boy, by poets styled ;
> Then *spare the rod and spoil the child*."

Butler may have obtained this inspiration from the Bible, but there (*Proverbs* XIII., 24) the words are, " He that spareth his rod hateth his son," while the words in the heading of this section do not occur in the Bible.

It is interesting to know that in *An Exposition of Vulgar and Common Errors adapted to the year of grace 1845*, the author, "Sir Thomas Brown Redivivus," treats (p. 25) the proverb itself as an error.

That the Proverb "Pouring oil on troubled waters" occurs in the Bible

It does not—unless the concordance has failed us! Dr. Brewer (p. 911, *Phrase and Fable*) states that, "The phrase is mentioned by the Venerable Bede in his *Ecclesiastical History*, written in Latin, and completed in 735. Stapleton translated the book in 1565."

It is not the physical fact which we dispute. "Oil" undoubtedly does have a smoothing effect, whether applied in the case of a sea storm or a brain storm! In fact, "oil" reduces friction in more senses than one.

That "That he who runs may read" occurs in the Bible, and that in its correct form it means "written so large that it may be read even when one is running"

The mistaken idea as to the meaning has doubtless arisen through the sentence being misquoted. The original words are, "And the Lord answered me, and said, Write the vision, and make it plain upon tables that he may run that readeth it."—*Habakkuk*, II., 2. From this the true meaning is clear, viz., that he who reads the information may run away and act upon it. The late Sir Frederick Bramwell, F.R.S., frequently pointed out this mistake, and said it would be better to misquote it (that is, if it is to be misquoted at all) "That he who reads may run," as thereby the original meaning would be preserved. To give it the erroneous meaning seems to imply that running was a usual form of locomotion in Biblical days! Curiously enough Keble, of all men, seems to have misused the quotation, thereby supporting the popular error, and incidentally giving rise to another fallacy, viz., that in hymn No. 168 (*Ancient and Modern*), "There is a book who runs may read"; the word "book" means the Bible. It is only necessary to read the first two verses of that hymn carefully to see that Keble's meaning was "the book of nature." The first two verses are :—

There is a book, who runs may read,
Which heavenly truth imparts,
And all the lore its scholars need,
Pure eyes and Christian hearts.

The works of God above, below,
Within us and around,
Are pages in that book, to show
How God Himself is found.

Note also that in each case the word " book " is not written with a capital B as it probably would have been if " Bible " were meant.

The last two lines of the last verse also support our contention. They are :—

Give me a heart to find out Thee,
And read Thee everywhere.

Even Sir Francis Bacon (*Advancement of Learning*, p. 120) committed this error, for he wrote, " . . . yet at some times it pleaseth God, for our better establishment and the confuting of those which are as without God in the world, to write it in such Text and Capital Letters, that as the Prophet saith, *He that runneth by may read it.*"

That " God tempers the wind to the shorn lamb " is a quotation from the Bible

Both Bartlett's *Familiar Quotations* and Wood's *Dictionary of Quotations* ascribe it to the *Sentimental Journey* by Lawrence Sterne, but " R. C. N.," writing in *T. P.'s Weekly*, June 6, 1913, said, " Sterne is said (wrongly, I believe) to have used first ' God tempers the wind to the shorn lamb,' used by Maria in *Sentimental Journey*. The French ' À brebis tondue, Dieu mésure le vent ' is older. The Roman Emperor Tiberius wrote ' Tonderi pecus, non radi debet,' and as the Roman Emperor ' Divus ' lightened the burdens of afflicted people the proverb perhaps arose from this."

Mr. Donald Gunn's note is :—

" From Sterne's *Sentimental Journey*. The idea, borrowed by Sterne from Geo. Herbert's *Jacula Prudentum* (1640), was a translation by Herbert from the *Prémices, etc.*, of Henri Estienne (Etienne, or Stephens) of 1594. Herbert renders it as ' To a close-shorn sheep God gives wind by measure.' Estienne's original is ' Dieu mésure le froid à la brebis tondue. The literal translation of which, I suppose, would be ' God pro-

portions (or adjusts) the wind to the shorn sheep,' but both 'temper' and 'lamb' increase the sense of mercifulness and improve the whole."

The quotation does not appear in a Concordance to the Bible. Mr. C. E. Clark states, p. 81, *More Mistakes We Make*, that Lawrence Sterne "frequently expressed his acknowledgments by means of italics," *i.e.*, italics were used by him for quotations, and the apothegm in question is given in his *Sentimental Journey* in italics.

That the Aphorism "In the midst of Life we are in Death" occurs in the Bible

It is not in the Concordance to the Oxford Bible, but it *does* occur in the Burial Service in the Book of Common Prayer, being in that part which is said at the grave side. It was taken from an old German hymn, said to have been composed by Notker, a monk of St. Gall, in A.D. 911, while watching workmen building a bridge at Martinsbrücke, their work apparently being of a dangerous character.

That the phrase "Skin of my Teeth" does not occur in the Bible

Remarkable to say, it does occur in the Bible, viz., in the *Book of Job*, Chap. XIX., v. 20, which is :—

"My bone cleaveth to my skin and to my flesh,
And I escaped with the skin of my teeth."

Notice "with" instead of the usual "by."

That Dr. Samuel Johnson defined or described "Fishing" as "a fool at one end of the line and a worm at the other"

The definition in his last folio edition of the "Dictionary" is "Commodity of taking fish," and there is no reference in the index to Boswell's *Life of Johnson* to either "fishing" or "fool."

"Dr. Johnson on Fishing.—We are all familiar with the 'worm at one end and a fool at the other' as a reflection on the angler and his art, which is commonly attributed to Dr. Johnson. Hawker, on worm-fishing, quotes Johnson, and criticizes his idiom out of his own mouth as well. Thus :—

"'But I name such a diversion only as a pastime for the juvenile performer, though not with the contempt as does Dr. Johnson, who says, 'Fly fishing may be a very pleasant

amusement ; but angling, or float fishing, I can only compare to a stick and a string, with a worm at one end, and a fool at the other."

" ' If, however, the poor angler should feel sore at the wit, he might, in his turn (if scavenger enough to descend to verbal criticism), have a little pleasantry with the philologer, by brandishing his rod and exclaiming,

" . . . . almost as bad, good doctor,"

as—a wag and a worm-fisher, with a comparison at one end and nothing to compare with at the other ! And when he has put away the stick and the string (and washed his hands) he may substantiate the propriety of his retort by looking out the words " compare to " to the doctor's own dictionary ; which we should be as unkind to the doctor, as he has been to the angler, if we did not estimate as the best authority in existence.'

" But where does Hawker get the passage quoted ? Johnson says nothing anywhere about the worm and the fool ; there is nothing of the kind in Boswell, nor yet in traditional Johnsoniana of any weight—at least I never came across it in the reading of my Johnson. As an old and keen angler of more than fifty years' standing I have no quarrel with the satire —quite the contrary ; but I simply ask, What right has Johnson to the credit of it ?—Mona."—*Notes and Queries*, Dec. 11, 1915, p. 462.

" Dr. Johnson on Fishing.—I am glad to see Mona's letter in which he points out that there is nothing in Dr. Johnson's writings, or Boswell's records of his sayings, to show that he ever described angling as ' a fool at one end of the line and a worm at the other.' This saying has been attributed to Johnson times out of number. I told the late Dr. Birkbeck Hill (who knew all there is to know about Johnson) that Johnson was very civil to our sport, and had suggested to Moses Browne, the pastoral poet, that a new edition of the ' Angler ' was wanted, and spoke of writing a Life of Walton. Would that he had done so ! Dr. Hill told me that he could not find that the libel on angling could be brought home to Johnson ; it seems that he, too, had taken it for granted.—R. B. Marston, Ed. *Fishing Gazette*, 19, Adam Street, Adelphi, W.C."—*Notes and Queries*, Jan. 1, 1916, p. 18.

" Dr. Johnson on Fishing.—I have to thank Mr. Dugdale Sykes for his quotation from Hazlitt, which is certainly sufficiently serious. Still, if the distinguished essayist were

challenged for his authority, one feels confident he could offer nothing better than use and wont among those who loved to have a fling at anglers and their pastime. That Johnson, like any other sound moralist, would be quick to emphasize his disapproval of any man wasting his time and money in the constant pursuit of any form of sport one can easily understand, but to express his contempt for angling as such is quite another thing, and the presumption against his doing anything of the kind seems to me exceedingly strong.

"Johnson read Walton's book, and was so much pleased with it that he expressed his intention of writing a biography of the author. There is at this moment a copy of 'The Compleat Angler' in existence, on the fly-leaf of which is written in Johnson's handwriting: 'A pretty book, a very pretty book'; and I think it may be fairly said that it is in the highest degree improbable, to say the least of it, that he would have written this if he entertained that contempt for the subject-matter of the book which the traditional saying attributed to him implies.

"Johnson was delighted with the delicate and gentle flavour of the good Royalist and Churchman which breathes in Walton's masterpiece, in spite of the writer's care to avoid anything in the least degree controversial, and Johnson was just the man to speak tenderly of the favourite pursuit of a man he liked. Reading between the lines, I am convinced Johnson angled himself. I have neither Boswell nor anything of Johnson at the moment by me, but any angler can see at a glance, as I did myself years ago, that in his Highland tour the Doctor was delighted when he came across the natives trout-fishing; heartily entered into the spirit of the work that was toward; applauded Boswell's own prowess with the rod, which, indeed, the latter displayed on Johnson's urging him to show what he could do—and, if my memory does not play me false, the old man most certainly had a try himself. All this, of course, does not exactly prove the negative, but it certainly justifies one in insisting on something more convincing than we now have before accepting the old sneer at the angler and his art as Johnson's.—Mona."—*Notes and Queries*, Feb. 19, 1916, p. 157.

"Dr. Johnson on Fishing.—I have an impression that the jibe about which inquiry is being made was due to the humour of Archdeacon Paley; but I cannot give chapter and verse of any record. The *mot* may have been for particular, not of

general, application.—St. Swithin."—*Notes and Queries*, March 11, 1916, p. 218.

That Napoleon was the Author of the aphorism "God is always on the side of big Battalions"

In *Familiar Quotations*, by John Bartlett, p. 335 :—

"Deos fortioribus adesse. Tacitus, *Hist. Book.* IV., XVII.

"Dieu est d'ordinaire pour les gros escadrons contre les petits. Bussy Rabutin, *Lettres*, IV., 91., Oct. 18, 1677.

"Le nombre des sages sera toujours petit. Il est vrai qu'il est augmenté ; mais ce n'est rien en comparaison des sots, et par malheur on dit que Dieu est toujours pour les gros bataillons.—Voltaire *to M. Le Riche, Feb.* 6, 1770."

"J'ai toujours vu Dieu du côté des gros bataillons.—De la Ferté *to Anne of Austria.*"

From the above we see Tacitus is an easy winner for he flourished in the first century !

"'*God is on the side of the big battalions.*'—Frederick the Great seems to have a good title to the authorship of this saying. Zeller, the historian of Greek philosophy, in his work on 'Frederick the Great as Philosopher' (p. 219), referring to the 'Œuvres de Frédéric,' xviii., 186, 188, says that in a letter to the Duchess of Gotha, about 1757, he writes that, as regards Providence, he cannot shake off the prejudice that in war God is on the side of the big battalions, which at present are in the enemy's camp. Carlyle gives the date of this letter as May 8, 1760, and assigns the 'real ownership' of the saying to Frederick, quoting the original French : 'Dieu est pour les gros escadrons' ('History of Friedrich II.,' Bk. XIX., chap. viii., vol. v., p. 606. ed. 1865).—Adecto."—*Notes and Queries*, Jan. 20, 1917, p. 56.

"Mr. Alfred S. E. Ackermann will find the equivalent of '*God is on the side of big battalions*' in one of the letters of Madame de Sévigné. Possibly research will overthrow her claim to be the first writer to make such an obvious remark. Edward S. Dodgson."—*Notes and Queries*, Jan. 13, 1917, p. 38.

That Amru, by order of the Caliph Omar, burnt in the year A.D. 640 about 700,000 rolls or volumes from the two Libraries at Alexandria

If mistakes must be made, professional pride makes us wish that engineers should not be the culprits ; it was, therefore,

with considerable pain that we read, at p. 11 in the presidential address of Samual Boswell, M.I.Mech.E., on " Ancient and Modern Engineering," to the Manchester Association of Engineers on Oct. 9, 1915, that, " It was finally distributed by sending the said 700,000 rolls to the various public baths in the city where, for six months, they served as fuel."

In the article on Alexandria, *Ency. Brit.*, Vol. 1, p. 494, the foregoing is given as the " story " told by Abulfaragius, but at p. 778 of the same volume it is stated, " To Amru has generally been attributed the burning of the famous Alexandrian library, by command of the Caliph Omar. But with this act of barbarism, so inconsistent with the character of Omar and his general, he is for the first time charged by Abul-Faragius, a Christian writer, who lived six centuries later. It is highly probable that few of the 700,000 volumes collected by the Ptolemies remained at the time of the Arab conquest, when we consider the various calamities of Alexandria from the time of Cæsar to those of Caracalla and Diocletian, and the disgraceful pillage of the library in A.D. 389, under the rule of a Christian bishop, Theophilus (see Gibbon, c. 51)." While at p. 511 of Vol. 14 we read, " The usual statement that from the date of the restoration of the Bruchium under Cleopatra the libraries continued in a flourishing condition until they were destroyed after the conquest of Alexandria by the Saracens in A.D. 640, can hardly be supported . . . so we may be tempted to agree with Gibbon that the report of a stranger who wrote at the end of six hundred years is overbalanced by the silence of earlier and native annalists."

The *Harms. Ency.* I., 144, says, " The Great Library and Museum were destroyed during Cæsar's wars (48-47 B.C.), the ' Daughter ' Library and Serapeum by command of Theodosius (A.D. 389). The story of the destruction of the Alexandrian Library by Amru is discredited by the best authorities . ."

That the expression " a sheer hulk " means a derelict Hulk without Masts

At p. 65 of *Notes and Queries*, March, 1919, St. Swithin gave the following quotation from p. 65 of *Some Recollections*, by Admiral Sir Cyprian Bridge, " The Ship's masts had to be brought to her and put in place. This was done at our naval ports by means of sheers . . . At Devonport they were erected in a hulk lying in the stream, and always spoken

of as ' the sheer hulk.' This recalls a ridiculous mistake in the song, which says, ' . . . . here a sheer hulk lies poor Tom Bowling.' What is meant is, of course, a mere hulk ; for a sheer hulk was a much used and very useful vessel. The mistake is only one of several which landsmen are likely to make when they put sailors' expressions into print."

The *Concise Oxford Dict.* gives, " Sheer 3 n. hoisting-apparatus of two poles attached at or near the top, and separated at the bottom for masting ships, or putting in engines, etc., used in dockyards or on *sheer-hulk*, dismasted ship used for the purpose."

Sheer-legs, or shear-legs, are, in fact, a form of crane.

That the strict Meaning of the Phrase " of that ilk " is " of that family, class, set, or lot "

Of that ilk means " of the same (estate) " ; thus Guthrie of that ilk means Guthrie of Guthrie.

The following is from *Notes and Queries*, Aug. 7, 1915 :—

" ' Of that Ilk.'—The ' N.E.D.' gives under ' ilk,'

" ' Erroneously, *that ilk :* That family, class, set, or " lot."

" ' 1845, Miall in *Nonconf.*, Mr. Hume, or Mr. Roebuck, or any member of that ilk. 1881, " Annihilation," It has been left for our friend Dr. —— and that ilk, to discover the long mistake.'

" It is a common error of Southron newspapers to make use of this expression as a substitute for ' of that kidney.' How would they translate Wemyss of that ilk (Wemyss of Wemyss) into the vernacular of Fleet Street ? A. R. Bayley."

Dr. Brewer, *Phrase and Fable*, 1904, says, " Ilk. The surname of the person spoken of is the same as the name of his estate. It is quite a mistake to use the phrase ' All that ilk ' to signify all of that name or sort. *Bethune of that ilk* means ' Bethune of Bethune.' Gælic, *ilk*, clan ; Anglo-Saxon, *ilc*, the same."

That Sir Walter Scott was the Author of the Proverb " Blood is thicker than Water "

It occurs in Scott's *Guy Mannering*, Chap. XXXVIII. (1815).

There was a long note at pp. 356-7, *Notes and Queries*, July, 1917, dealing largely with the claim that Commodore Tattnall, of the United States, was the first to use the expres-

sion in connection with the attack by British and French ships on Taku forts on Aug. 21, 1860. This note refers to an earlier reference to the matter in *Notes and Queries*, 9 S. VIII., 238. At the earlier reference the editor's note states that *Ency. Brit.*, 11th ed., has, " Commodore Tattnall may be said to have gained a world-wide reputation by his use of the phrase ' Blood is thicker than water ' to justify his intervention." The note goes on to say, " The late Vincent S. Lean stated at 7 S. XII., 114, that Edward's *Words, Facts, and Fancies* was wrong in saying that it is to be found in the 1672 edition of Ray's *Collection of English Proverbs.*" . . . " Mr. Lean said that he had found the proverb in the British Museum copy of the 1797 ed. of Allan Ramsay's *Collection*, the first edition of which had appeared in 1737."

That " Cleanliness is next to Godliness " is a quotation from the Bible

It is not in the Concordance attached to an Oxford edition of the Bible, but it is found at p. 183 of Bartlett's *Familiar Quotations*, where it is ascribed to John Wesley :

" Certainly this is a duty, not a sin.
' Cleanliness is indeed next to Godliness.' "
Sermon XCII., On Dress.

That to eke means to make or endure, as e.g., " To eke out a miserable existence "

" I speak too long ; but 'tis to peize [poise] the time ;
To eke it and to draw it out in length,
To stay you from election."
Merchant of Venice, III., ii., 22

" And ever shall
With true observance seek to eke out that
Wherein toward me my homely stars have failed
To equal my great fortune."
All's Well that Ends Well, II., v , 73.

" Still be kind,
And eke out our performance with your mind."
Henry V., III., Prologue, lines 34-5.

At p. 14 of the *King's English* (1906), by H. W. & F. G. Fowler, we find, " To *eke out* means to increase, supplement, or add to . . . It does not mean to make, nor to endure. From its nature it will very seldom be used (correctly), though it conceivably might, without the source of the additions being specified." Prof. Ernest Weekley, M.A., p. 105,

Romance of Words, says, " The opposite has happened in the case of *a newt* for *an ewt* and *a nick-name* for *an eke-name*. *Eke*, also, occurs in the first stanza of John Gilpin. It is cognate with Ger. *auch*, also, and Lat. *angere*, to increase." The *Concise Oxford Dic.* agrees with these. *Cf. an apron for a napron.*

That the sentence " Esau sold his birthright for a mess of pottage " is an exact quotation from the Book of Genesis

Mr. C. E. Clark says this statement used to be placed in early Bibles in the chapter-heading, but not in the text. The account is given in *Genesis* XXV., vv. 28-34, and the word " mess " does not occur, but only " red pottage." Furthermore, the " consideration," as the lawyers term it, for the sale of the birthright is not mentioned. Two separate statements are made: (1) that Esau sold his birthright to Jacob, and (2) that " Jacob gave Esau bread and pottage of lentils," but it is *not* stated that the birthright was sold for the pottage. In verse 16 of Chap. XII. of the *Epistle to the Hebrews* we find, " . . . as Esau, who for one mess of meat sold his own birthright." This statement does not seem to be justified by the account in *Genesis*, and we know of no other to justify it.

That Dr. Johnson said, " Sir, let us take a walk down Fleet Street "

Mr. C. E. Clark quotes from *G. A. Sala's Life and Adventures*, " To this periodical I gave the name *Temple Bar*, and from a rough sketch of mine of the old Bar, which blocked the way in Fleet Street, Mr. Percy Macquoid drew an admirable frontispiece. As a motto I *imagined* a quotation from Boswell: ' And now, Sir,' said Dr. Johnson, ' we will take a walk down Fleet Street.' To the best of my knowledge and belief Dr. Johnson never said a word about taking a walk down Fleet Street; but my innocent *supercherie* was, I fancy, implicitly believed in for at least a generation by the majority of magazine readers."

That a Miniature is so named because it is a Small Painting

It is usually thought that the derivation of miniature is from Lat. *minimum*, smallest; but this is not so. There is a verb miniate, to paint with vermilion, from Lat. *miniare*

(*minium* native cinnabar, red lead); and miniature is from Lat. *miniatura* from *miniare*. Prof. Ernest Weekley, p. 74, *Romance of Words* (1912), has, "Change of meaning may be brought about by association. A *miniature* is a small portrait, and we even use the word as an adjective meaning 'small, on a reduced scale.' But the true sense of *miniature* is something painted in *minium*, red lead. Florio explains *miniatura* as 'a limning, a painting with vermilion.' Such paintings were usually small, hence the later meaning. The word was first applied to the ornamental red initial capitals in manuscripts."

That the "Riddle of the Sphinx" means that the origin or object of the Sphinx is a Riddle to us

The phrase "the riddle of the Sphinx" means the riddle which the Sphinx is said to have asked Œdipus. Bacon gives the story in his *Wisdom of the Ancients*, Chap. XXVIII., to the effect that the Sphinx propounded certain dark and perplexing riddles, and if the wretched captives could not at once solve and interpret the same she cruelly tore them to pieces. The Thebans offered to any man who should expound the Sphinx's riddles the sovereignty of Thebes as his reward. Œdipus gave the right answer which gave him the victory, and he thereupon slew the Sphinx. Sir Ernest Wallis Budge, M.A., D.Lit., F.S.A., p. 295, *The Nile*, says, "Around the imposing relic of antiquity, whose origin is wrapped in mystery, a number of legends and superstitions have clustered in all ages; but Egyptology has shown (1) that it was a colossal image of Rā-Harmachis, and therefore of his human representative upon earth, the King of Egypt, who had it hewn; and (2) that it was in existence in the time of, and was probably repaired by, Cheops and Chephren, who lived about 3,700 B.C."

That St. Paul was the Author of the Proverb, "Evil communications corrupt good manners"

St. Paul uses the proverb in I. *Corinthians* XV., 23, but the famous Greek comic poet Menander had expressed the sentiment before him. Wood's *Dic. of Quotations* calls it a "proverb," and mentions neither St. Paul nor Menander; while Bartlett's *Familiar Quotations* gives the reference to Corinthians, and, in a footnote, the quotation from Menander.

That Jonathan Swift was the Author of the Toast:

"God bless the King! I mean the faith's defender;
God bless—no harm in blessing—the pretender;
But who pretender is, and who is King—
God bless us all—that's quite another thing."

The author was John Byrom (1691-1763), who addressed the toast, extempore, to an officer of the army. These facts will be found in Bartlett's *Familiar Quotations*.

That Shakespeare was the Author of:

"'Tis not in mortals to command success,
But we'll do more, Sempronius; we'll deserve it."

Joseph Addison was the author, *vide* his *Cato* I., ii., and Bartlett's *Familiar Quotations*, p. 147.

That Dr. Johnson was the first to define an Ambassador as "an honest man sent to lie abroad for the Commonwealth"

The author was Sir Henry Wotton (1568-1639), and in a letter to Velserus, 1612, Wotton wrote, "This merry definition of an Ambassador I had chanced to set down at my friend's, Mr. Christopher Fleckamore, in his album." Mr. G. R. Roney, writing on Aug. 25, 1919, said, "There is, I think, in *Pepys' Diary*, a story of an English Ambassador who defended his practice of always telling the truth by saying that the Ambassadors of other nations would not believe it at the time, and that afterwards it enhanced his reputation with his countrymen."

That a knowledge of formal Grammar is indispensable for Correct Writing and Speaking

That the above is a fallacy was first stated to the author by a reader of one of our large publishing houses whose work would give him plenty of opportunity for forming an opinion. On consulting Mr. Walter Jerrold (a grandson of Douglas Jerrold), the author, and reviewer of immense experience, he agreed that a knowledge of formal grammar was not indispensable, and said that he had never studied formal grammar. It is said that Herbert Spencer, Tim Healy and Frank T. Bullen are other examples of good writers who never studied formal grammar.

Mr. Donald Gunn, writing on Sept. 25, 1919, said, "I

would suggest Bunyan. As fine English, I fancy the first twenty or so lines of his opening to the *Pilgrim's Progress* would be hard to excel."

In 1854, Dr. Robert Gordon Latham, M.D., F.R.S., lectured at the Royal Institution on "The Importance of the Study of Language as a branch of Education for all Classes," and in it he said, "Gross vulgarity of language is a fault to be prevented, but the proper prevention is to be got from habit —not rules. The proprieties of the English language are to be learned, like the proprieties of English manners, by conversation and intercourse; and a proper school for both is the best society in which the learner is placed. If this be good, systematic teaching is superfluous; if bad, insufficient."

That Sir John Mandeville wrote "The Marvellous Adventures of Sir John Mandeville"

Sir John Mandeville (or de Mandeville) was born about 1300, and entered the service of Sultan Melek Madaron in 1327. The account of his travels was published in French in 1480, in German in 1481, and in English in 1499 or 1503. He died Nov. 17, 1372.

Messrs. Constable & Co. brought out a new edition of the *Adventures* in 1895, illustrated by Mr. Arthur Layard in the style of the fourteenth century. The *University Correspondent*, Nov. 16, 1895, in referring to this edition, said: "The popular tradition of the authorship, we might mention, however, is now exploded, and it is supposed that the original of the work is not English at all."

"Jehan de Mandeville, the name claimed by the compiler of a singular book of travels, written in French, and published between 1357 and 1371 . . . . this recital is of itself enough to provoke some little questioning, and on investigating the first courses of the book it will presently be obvious that part at least of the personal history of Mandeville is mere invention. Under these circumstances the truth of any part of that history, and even the genuineness of the compiler's name, become matter for serious doubt. No contemporary corroboration of the existence of such a Jehan de Mandeville seems to be known."—*Ency. Brit.*, XV., 473.

. . . . "It is most probable that the book was written under a feigned name by the physician Jehan de Bourgoine, otherwise Jehan à la Barbe, ... a statement has been discovered that Bourgoine revealed on his

death-bed his real name of Mandeville to Jean d'Outremeuse, explaining that he had had to flee from his native England for a homicide."—*Chamb. Ency.*

The article goes on to point out that most of the book was cribbed without acknowledgment from many authors and especially from Friar Odoric (1330).

Andrew Lang, M.A., dealt with Mandeville at pp. 118-120, *History of English Literature* (1912): "The author of this book was not an Englishman, at least he did not write in English, and he did write in French . . . . The author, whoever he was, stole from a manuscript of the time of the First Crusade, and from the book of Odoric, a Franciscan missionary . . . . from every source whence he could pick amusing stories. He fabled with a direct and honourable simplicity which is comparable to that of Defoe, and to the straightforward and moderate statements of Swift's Captain Lemuel Gulliver."

That lbs. is the correct Contraction for "Pounds" (weight)

The connection between lb. and pound is not immediatey obvious until it is realised that lb. is a contraction of the Latin word *libra* (a pound). The Latin plural is *libræ* (which has no "*s*"), so that by derivation lbs. is obviously wrong, the "s" having been added in error; ft. is the contraction of both "foot" and "feet," and to write fts. for feet would be no more objectionable than lbs. for *libræ*. The contraction lb. for the plural "pounds" is also not free from criticism, though it is perhaps less objectionable than lbs. and has the advantages that it saves 33 per cent. of the letters forming the contraction, and it is used by a fairly large number of writers. The rule for the formation of contractions of Latin plurals is to double the final letter of the contraction for the singular. E.g., MS. and MSS.; Cod. and Codd. (*Codex, Codices*); ed., edd. (editions); Cos. and Coss. (*Consul, Consules*); and the more familiar BRITT: [OMN: REX, on every halfpenny and penny] for *Britanniarum* which has only one "t." MM. is used for "members," e.g., MM.I.C.E. = members of the Inst. Civil Engineers. An interesting case is that which occurs at the beginning of the Catechism: "*Question.* What is your name? *Answer.* N. or M.," *i.e.*, if the candidate has one or more names he is to state them, and originally it was N. or NN. (for name or names), but the MS. nn got mistaken for m! In *Rules for Compositors and Readers at*

the University Press, Oxford, by H. Hart, M.A., Printer to the Univ. of Oxford, with the English spellings revised by Sir James A. H. Murray, M.A., D.C.L., H. Bradley, M.A., Ph.D., we are told at p. 34 to print lb. for both singular and plural, and not lbs.

That it is correct to call all Inhabitants of the United States "Yankees"

There are various theories as to the derivation of the word (for which see the *Cent. Dict.*) but no doubt as to its proper use, that is, it is a name applied to a citizen of the New England States. The term was much used (and in a contemptuous sense), during the Civil War (1861-5), by the Confederates in speaking of the Union or Federal soldiers. It was also previously so used by the British soldiers during the Rebellion (1775—82).

"*Yankee*, in the American use, does not mean a citizen of the United States as opposed to a foreigner, but a citizen of the Northern New England States (Massachusetts, Connecticut, &c.) opposed to a Virginian, a Kentuckian, &c." —De Quincey, *Style*, Note 1. Vide *Notes and Queries*, July 8, 1922.

That "Rule the Roast" is a Corruption of "Rule the Roost"

Dr. F. Trenchmann, M.A., Ph.D., writing on March 18, 1908, said, "This is another ingenious and erroneous assumption. In Green's illustrated *Short History of the English People* may be seen an old wood-cut representing a quarrel between 'Jack Ruleroast' and another, in the background of which is seen a cook-shop with poultry on spits, clearly indicating that 'Jack Ruleroast' kept a cook-shop."

That the "Cockney" Accent and Phraseology are invented by people living within the sound of Bow Bells

At p. 2 of a report (issued before April, 1911) on the conference on the Teaching of English in London Elementary Schools, by the London County Council, it is stated, ". . . and it must not be forgotten that London has a special responsibility for the maintenance of a second century standard of English as is spoken in a literary medium. . . . There is no London dialect of reputable antecedent and of origin which is an heritage for him to surrender in full. The cockney

mode of speech with its unpleasant twang is a modern corruption, without legitimate credentials, and is unworthy of being the speech of any person in the capital city of the Empire. There, if anywhere, the endeavour should be made to diffuse as widely as possible the standard English which is the result of a long process of development as being a normal national means of expression."

The Con. Ox. Dic. does not limit the area to within earshot of Bow Bells, for it defines a cockney as " a native of London." On the other hand, Chambers's *Book of Days*, I., 301, says, " A cockney is usually defined as a person born within hearing of Bow Bells ; Stow, however, who died early in 1605, nowhere mentions this notion, so that it is probably of more recent origin."

Mr. Alfred Anscombe contributed the following amusing example of the cult to *Notes and Queries*, Oct. 30, 1915, p. 349:—

" Cockney Speech.

" Tell yer waut, MistrEderter, HI knows aow fairmuynded er man yew ar, an aow willin ter give hevry one ees chaunst (now one be"er), sow I sez ter myself I sez, ' Haow'd it be 'f I wrowte a few luynes erbaout Cauckneyissums in aunswer ter Mr. Ackermann, waut waunts ter know erbaout deferni tions.'

" Well fust aout there's the spellin, wich ees muyty differcult. Caus wy ? Caus we aighn't gaut letters ernough. See ere naow. 'Few've any desuyer ter be c'rect down yew ivver spell the litery word ' paper ' wiv an i in Cauckney—naut unless yer hindulgin in carrerkertoor. Mr. Punch, ee wruytes Dossetshir a wiv two e's, ee does. F'rinstance—' Jeemes.' Naow aour Cauckney a, it's more owpin luyke, but eet aighn't now i, 'strewf it aighn't. Wen I sez ' laighces ' HI aighn't a-finkin 'baout hinsects—git aout. Saighm wiv paighper. Some years ergo, in dear ole ' N. & Q.,' a corryspondent, oose naighm I've fergaut, ee truyed ter prove as aow Cauckneys didn' saigh ' piper ' in Mr. Chorles Dickens's tuyme. That gent's argyments was very good, but ee fergaut one fing, straight ee did. Good ole Chorlie ee lived een Baigham Street, Camdin Taown, ee did, wen ee was a boy, and now Dossetshir a was eard in Pancras then, swelp me. Wen Chorlie wrowte ' paper ' as one er that there noosboy's calls, he yerd ' paighper,' en wat's more ee said ' paighper ' eesself—yew taighk eet from me.

"HI've bin towld as aow litery people gits their speech waut they calls hinfected frough livin in London. Fren er nuyne, oo shall be naighmless (hee was a Perfesser at Liverpool, in the Unerverserty, hee was, fore ee went beck ter Berlin ter taighk the plaighce of H— Z—, dee-ceased), ee towld me as aow a London laighdy—laighdy er tuytle, mine yer—oo went daown ter Liverpool ter lecksher, walked up ter th' readin desk an looked raound at the B.A.'s and the M.A.'s, an started off wiv—'The other daigh—' Naow this aighn't furough Cauckney, but 'daigh' hees a bit of all ruyght. It's Saouf-Heastern, eet ees, see? In the ole Kentish dyaleck a faousand years agow they sed 'daigh,' an they spelt it *dæi;* fact! King Elfred hee sed *dæg*, ee did. That there i is waut fonolergists calls i-consernant.

"'Nuvver frendermuyn ee sez ter mee, 'Enery,' he sez, 'wa'dcher call these figgers?' I looks an I sees 1, 2, 333, an I sez, 'Won, too, and free underd an firty-free,' an ee larfs. I tawked beck at eem an I sez, 'If my mispernounciation of 3's is wraung aow erbaout your spelling, wiv yer o, n, e, won! an yer t, w, o too!! Garn!!! Bsides, my hancesters sed "free" before the Conq-rer caighm.' Aow do HI now? Caus the plaighce daown in Essex waut the Venererble Bede called Ythancaster they called Effecester. See? You'l find Effecester in Doomsdaybook, 'few look. London's in the Heastern Caounties, eet ees (vide Censer), an there aighn't now need ter be sow stuck up erbaout the Heast Midlan dyaleck like them Caighmbridge cowves is. Yew mer fink eet low wen a furough Cauckney sez f 'stead er th. Look at the Hemprer of Russia, naow ee never sez nuffink else but Feodor, hee down't, and ee means Feodore all the tuym, saighm as mee.

"Ivver ear tell er the 'glottal stop'? Yew d'now waut the glo"al staup ees? Well HI'll tell yer. 'Few try ter saigh 'lucky' wivaout the ck you'll git eet: lu"y, see? They've gaut eet in Glasgow an we've gaut eet in London. Mos'ly we've gaut eet wiv aour t. F'rinstance, we saigh mu"on an bu'on 'stead er the litery 'mutton' and 'button,' en such luyke.

"'Nuvver fing as we gow in fer is meetafersis. F'rinstance, I sez interduction an pernounciaightion, HI do. Well, thet's meetafersis, see?

"Yus, I've eard erbaout it:—

'Vite vine an winnygur
Werry good wittles I wow,'

but I fink it's silly. I knew a man once waut used to saigh 'wan' for van, but ee duyed a very laung wuyle agow.

"This ain't arf, but—— So long!

"'ENERY.

"[We think our readers will like to know for certain—what they perhaps have guessed in reading it—that this ingenious exposition of Cockney speech is from the pen of our valued contributor Mr. Alfred Anscombe.]"

We may conclude with a story of an amusing misunderstanding owing to Cockney pronunciation which is said to have occurred in the trenches in France during the European War. One Londoner called out to his pal, "'Ave yer got any laices?" "No; we are clean in our trench." "I don't mean lousy laices, I mean boot laices."

That Samuel Butler was the Author of the couplet :

**"He who fights and runs away may live to fight another day ;
But he who is in battle slain can never rise and fight again"**

Mr. Donald Gunn has dealt with this as follows, "This is often given as a quotation from the *Hudibras* of Butler, and it was so given in a book published in 1762, *The Art of Poetry on a New Plan*. But it is more nearly a quotation from another book that had appeared 10 years earlier (1752), Ray's *History of the Rebellion* :—

'He that fights and runs away
May turn and fight another day;
But he that is in battle slain
Will never rise to fight again.'

where they are given without quotation marks: so that it seems fair to credit Ray with having written these lines till an older instance of their use is found.

"The idea is no doubt an elaboration of the lines in Butler's *Hudibras* (Part III., Canto iii., 241-4) :—

'For those that fly, may fight again,
Which he can never do that's slain,
Hence timely Running's no mean part
Of conduct, in the Martial Art.'"

That Shakespeare was the Author of "Off with his head, so much for Buckingham"—King Richard III., IV., iii.

Colley Cibber, the actor-manager of Drury Lane Theatre, and Poet Laureate, introduced the line.—Arthur Dasent, pp. 231-2, *Piccadilly*. And Bartlett's *Familiar Quotations*, p. 146.

That Shakespeare was the Author of, "A horse, a horse, my kingdom for a horse"

The quotation is from King Richard III., V., iv., 7 and 13. The lines were introduced by Colley Cibber, the Actor-Manager of Drury Lane Theatre, and Poet Laureate, who died 1757.—Arthur Dasent, pp. 231-2, *Piccadilly*.

That "To go the way of all flesh" is a quotation from the Bible

"This expression is commonly supposed to be a quotation from the Bible, but it is not to be found in Cruden's *Concordance*. 'To go the way of all the earth' occurs in two passages of the Old Testament (*Jos.* XXIII., 14; and I. *Kings* II., 2); and the biblical use of 'all flesh' in the sense of 'all mankind' is well known. It would appear, therefore, that the common phrase is a combined echo of more than one passage of Scripture. The combination, however, is of very old date. A charter of A.D. 900 (Kemble *Cod. Dip.* No. 1077, Birch *Cart. Sax.* No. 594) has the words "quando Ælfred rex viam universae carnis adiit.' Can any patristic source be found for this curious variation from the 'universae terrae' of the Vulgate? HENRY BRADLEY."

Notes and Queries, Dec. 30, 1922, p. 530.

ETYMOLOGY

That the literal translation of " Solar topi " is " Sun Hat "

A SOLAR topi is a pith hat or helmet used in India. The Sola is a tall, leguminous swamp plant (*Æschynomene aspera*) found widely in the Old World tropics. Its robust stems are of a pith-like texture (*spongewood*), and it is they which are used for the construction of the light and cool helmets. The final " r " in " solar " is added in error, under the impression that the word is the adjective solar, referring to the sun.

The authority for the foregoing is the *Century Dic.*

Mr. Amal Ganguli, writing from Calcutta on May 8, 1918, said that *solar* is a Bengali word (which agrees with the *Cent. Dic.*), and that the Bengali letter (the sound of which is equivalent to the English *r*) is used at the end to denote the possessive case. Thus *solar topi* means sola's hat, or hat made of sola.

That Jutland is so named because it juts into the Sea

The author remembers being given the above explanation when at school. It really means the land of the Jutes, these being a low German tribe originally inhabiting Jutland.

That " damn " is a " good old Saxon " word

I hope that calling attention to the derivation of this word will not be robbing anyone of any part of the satisfaction to be derived from its use. It is derived from the Latin, *damnare*, to condemn, and it is interesting to notice that many languages have practically the same word. French, *damner ;* Provençal, *damnar ;* Old Spanish, *damnar, dañar ;* Portuguese, *damnar ;* Italian, *dannare ;* while in Old High German we have *firdamn n ;* Middle High German, *verdamnen ;* German, *verdammen.*

That our ancestors used to say " ye " for " the " as in " Ye Olde Englyshe Fayre "

In Anglo-Saxon or Middle-English there was a symbol Þ (the letter " thorn"), which is now written *th*, but which

used to be represented by *y*, consequently *ye* represented our *the*, and should be pronounced *the*, which is the old, as well as the present, correct pronunciation.

That "Beefeater" is a corruption of a French word "buffetier"

Dr. F. Trenchmann, M.A., P.D., is the contributor of this, and in addition to his authority for it being a fallacy, we have the *Century Dictionary*, which says: "The oft-quoted etymology from a supposed '*buffetier*,' and buffet, a sideboard, is mere fiction."

Dr. Brewer states that Prof. Skeat says no such word as *buffeter* has yet been found in any book; nor does *buffetier* exist in French. Having gone thus far, however, Dr. Brewer ends with no fewer than six "Arguments in favour of the old derivation"!

In Prof. Ernest Weekley's delightful *Romance of Words* (1912), p. 178, we read:—

"The obvious and simple derivation of *beef-eater*, *i.e.*, a man who is in the enviable position of being sure of his daily allowance, has been obscured by the invention of an imaginary Fr. *beaufetier*, waiter at the side-board. Prof. Skeat attributes the success of this myth to its inclusion in Mrs. Markham's *History of England*."

The Concise Oxford Dic. says, "*beefeater*, yeoman of guard, warder of Tower of London; from obsolete sense 'dependant.'"

That "Welsh Rabbit" is a corruption of "Welsh Rarebit"

Dr. F. Trenchmann, M.A., Ph.D., wrote, "The person (or parson, who seems to be the chief offender in respect of ingenious etymologies) was evidently lacking in a sense of humour. The expression Welsh rarebit would imply the existence of a word 'rarebit' used absolutely. I do not think it exists. The Australians have a dish (mutton cooked in a certain way with stuffing) which they call 'colonial goose,' probably originating before the introduction of real goose into the country. Possibly at one time there were no rabbits in Wales."

Under "rarebit" the *Cent. Dic.* has, "An altered form of *abbit* in the phrase *Welsh rabbit*, simulating an absurd derivation from *rare bit*, as if 'a rare delicacy.'"

Macmillan's Magazine has, "*Welsh rabbit* is a genuine

slang term, belonging to a large group which describe in the same humorous way the special dish or product or peculiarity of a particular district. For examples: an 'Essex lion' is a calf; a 'Fieldlane duck' is a baked sheep's head; 'Glasgow magistrates' or 'Norfolk capons' are red herrings; 'Irish apricots' or 'Munster plums' are potatoes; 'Gravesend sweetmeats' are shrimps."

That "Scan" means to Glance through hurriedly and casually

"Scan, to go over and examine point by point; examine minutely or nicely; scrutinize."—*Century Dic.*

"Scan, to examine carefully: to scrutinize."—*Cham. Ety. Dic.*

"Scan, look intently at all parts successively of (face, horizon, etc.)."—*Concise Oxford Dic.*

That the words "Tram" and "Tramway" are derived from the name of Mr. Benjamin Outram

"*Tram* is persistently connected with a Mr. *Outram*, who flourished about 1800. This is another case of intelligent anticipation, for the word is found in 1555. It means log or beam, and was probably first applied to a log-road laid across bad ground, what is called in America a 'corduroy' road." Prof. Ernest Weekley, at p. 178 of his *Romance of Words* (1912).

"Sir,—Your correspondent Mr. D. C. Outram, in thinking that the word 'tramway' owes its derivation to the name of Benjamin Outram, is falling into a very common error, for the word was in use long before this time. A 'tram' was a coal waggon or cart for carrying coal by the common roads from the pits to the ships.

"In 1794 (five years before the tramway Mr. Outram mentions) an Act of Parliament was passed for making 'an iron drain-road, tram-road or railway between Cardiff and Merthyr Tydvil.'

"F. STANFORD ELKINGTON."

Daily Mail, Sept 20, 1910.

"Tramways, old Swedish *tram*, 'log, wooden sledge'. This 'tramway'—a name said falsely to be derived from one Benjamin Outram belonging to a Derbyshire family—as in other earlier specimens, had a flange cast on its outer edge to keep the wheels on the road."—*Cham. Ency.*, Vol. X., p. 268.

The *Cent. Dic.* also gives the old Swedish derivation.

" The iron rail was again improved by a flange, called a ' trammel,' which retained the wheels of the waggon in their straight course, and thenceforward the lines became ' trammel roads.' With our taste for cutting every term as closely as possible, the word quickly became ' tram '-way or tramroad."—Henry Frith, *The Romance of Engineering*, p. 179.

Dr. E. C. Brewer, *Phrase and Fable*, agrees with the foregoing.

That " Forest " has always meant a large tract of Land covered with Trees

Under " Forestry," in the *Harms. Ency.*, we read, " The word ' forest ' applies to an area of land set apart for hunting and other sport, and the presence of trees is not implied, though they may exist. Nevertheless forestry has been accepted as implying the cultivation of timber, and as such it is now treated. The word sylviculture, or even arboriculture, would be doubtless more applicable, but forestry has a wider significance."

The word is from L. *foris*, outside (the walls of the park). The *Cent. Dic.* says, " Properly a forest or space of ground over which the rights of the chase were reserved." " Forests are waste grounds belonging to the king, replenished with all manner of chase or venery ; which are under the king's protection, for the sake of his recreation and delight."—*Blackstone's Com.*, I., viii. ". . . a *royal forest*—that is, a hunting preserve created since the Conquest. The presence of trees, I need hardly say, is not required to make a *forest* in this sense. The great mark of it is the absence of enclosures."—Sir Frederick Pollock, p. 40, *Land Laws*.

That Towns whose names end in -caster, -cester, or -chester are on the sites of Roman Camps

Mr. E. B. Osborn had a long article on " English Place-names " in the *Morning Post*, Mar. 12, 1915, in which he wrote, " Latin was spoken only by a few townsfolk and wealthy land owners, and the place-names they left are for the most part Latinised forms of Celtic or pre-Celtic appellations. Very few of the names ending in *-caster*, *-cester*, or *-chester*, which are popularly supposed to prove the existence of a Roman camp or fort (*castrum*), really date from Roman times. Examples

of a kind of beguiling mimicry are not uncommon here. . . Indeed, most of the Latin on the map is no older than the Middle Ages, and, as in the case of Devizes (Divisis, or ' divisions '), mighty poor pig-Latin it is."

Closely related to the foregoing, and showing how cautious it is necessary to be when dealing with history, is the following matter from *Shearer's Historical Guide to Stirling* (1908). At p. 102 J. E. Shearer, F.S.A.Scot., F.R.S.G.S., deals with " The site of the Battle of Stirling Bridge," and says, " Sir Robt. Sibbald, a famous physician, naturalist, and antiquary, gave special attention to Roman antiquities, but it must be remembered he lived before the time when the manufacture of spurious Roman camps, roads and forms became fashionable. . . . In the beginning of the 18th century Roman roads and camps in the ancient geography of Scotland were laid down by the manufacturers of Roman remains in extravagant profusion.

" . . . Anyone who cares to study the geography of Scotland during the Roman period will discover that the recognised map of Roman Scotland from 1757 to 1866 was nothing else than a fraud, and even to a later date had this fraudulent map for its foundation. Portions of these roads are to be seen on the best maps at the present time. It was the work of a clever swindler called Bertram. He passed off this 1757-8 work as that of Richard of Cirencester, a Benedictine monk of Westminster, who flourished in the 14th century."

That the word " Cabal " is derived from the Initials of the Five Politicians who formed the first Cabal

This we were certainly taught in our youth—it is, alas, not the only wrong thing we were then taught, and were this not so generally true there would be no need for such a book as this.

Prof. Ernest Weekley, M.A., p. 179, *Romance of Words* (1912), tells us, " But the most indestructible of all these superstitions is connected with the word *cabal*. It comes from a Hebrew word meaning hidden mystery, and is found in the chief Romance languages. The word is of frequent occurrence in English long before the date of Charles II.'s acrostic Ministry, though its modern meaning has naturally been affected by this historic connection." The *Concise Oxford Dic.* points out that the popular derivation is wrong.

That the name of the celebrated Soapmaker is Pear

Inaccuracy of observation is the cause of this mistake, for it will be found on nearly every hoarding in London and elsewhere that the name is Pears. In the possessive the name is, of course, written Pears' and not Pear's, as it would be if the maker's name were Pear.

That "Dunce" has always meant a stupid, ignorant person

There are a few words in English the present meanings of which are exactly the reverse of former ones. The word "dunce" is an example,* and is derived from the name of Joannes Duns Scotus (*c.* 1265 to 1308), a famous scholastic, professor of theology at Oxford in 1301. His name *Duns, Dunse, Dunce* came to be used as a common appellative, "a very learned man," and being applied satirically to ignorant and stupid persons, gave rise to *dunce* in its present sense.

The *Cent. Dic* says his followers were called *Scotists*, and that the reformers and humanists regarding them as obstinate opponents of sound learning and of progress, and their philosophy as sophistical and barren, applied the term *Dunsman* (which at first meant simply a Scotist) to any caviling, sophistical opponent; and so it came finally to mean any dull, obstinate person. Archbishop Trench, p. 110, *The Study of Words*, ". . . He, the 'subtle Doctor' by pre-eminence, for so his admirers called him, 'the wittiest of the school divines,' as Hooker esteems him, could hardly have anticipated, and as little as any man deserved, that his name should be turned into a byword for stupid and obstinate dullness."

That the only meaning of "Dungeon" is an "Underground Cell or Prison"

"Colevile should be still your name; traitor your degree; and the dungeon your place, a place deep enough; so should you be still Colevile of the dale."—Henry IV (2); IV., iii., 6.

In France the donjon of a chateau or castle is its tower or keep. *The Concise Oxford Dictionary* says, "Dungeon (now usually *donjon*), great tower of castle in innermost court or bailey; strong subterranean cell for prisoners."

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* Another example is "nervous"—

What nervous *arms he boasts! how firm his tread!*
His limbs how turn'd!

Broome in Pope's Odyssey, viii., 147.

The Century Dictionary says, "Dungeon, the principal tower of a medieval castle. It was usually raised on a natural or artificial mound and situated in the innermost court or bailey, and formed a last refuge into which the garrison could retreat in case of necessity. Its lower or underground part was often used as a prison. Also called *keep*, *dungeon-keep*, or *tower*."

That "Lantern" is derived from "Lant" and "Horn"

Seeing that the sides of lanterns were formerly made of horn, this is a pardonable mistake, but mistake it is nevertheless, for the word is from the Latin *lanterna*, a lantern, and that *lanterna* has nothing to do with "horn" is seen from the fact that the Latin for "horn" is *cornu*. "Lantern" was even formerly written "lanthorn," and the spelling was no doubt altered to its present form to make it conform more to its derivation.

That the word "Sirloin" was originated by King Charles II. (? Henry VIII.) knighting a Loin of Beef on a Christmas Day

Brewer gives "sirloin" as a corruption of "surloin"; so does the *Con. Ox. Dict.*; so does *Lloyd's Ency. Dict.* which has this entry:—

"Sirloin, surloin [Fr. *surlonge*, from sur (Lat. *super* = above) upon, and *longe* = a loin] . . . . The spelling *sirloin* is derived from the erroneous idea that this joint was knighted by Charles II. in a merry moment."

Prof. Ernest Weekley, M.A., at p. 178, *Romance of Words*, says, "The word is found in the 15th century, and Fr. *Surlonge*, from which it comes, in the 14th. It is compounded of *sur*, over, and *longe*, a derivative of Lat. *lumbus*, loin. The belief in the knightly origin of *sirloin* was so strong that we find it playfully called the *baronet* (*Tom Jones*, IV., 10). Hence, no doubt, the name *baron* of beef for the double sirloin."

That the word "King" necessarily implies the Male Sex

The late Mr. S. L. Hughes, M.P., dealt fully with this word in the "Sub Rosa" column of the *Daily News and Leader*, Nov. 23 and 29, 1915, from which the following extracts are taken:—

"There is no necessary question of sex involved in the word 'king' . . . . A queen regnant—that is, a

princess who has inherited the sovereign power—is in reality king, but that is not so in the case of a queen who has that title as the consort of a king . . . . it has become customary to describe those sovereign ladies [Anne and Victoria] as Queens, but each of them was a King, whether the reader likes it or not . . . . The Hungarians responded to Maria Theresa's appeal with shouts, 'We will die for our King Maria Theresa—long live King Maria Theresa.'" "King" means "Head of the State," "Ruler," "Chief," or "Principal." This meaning is seen in such compounds as "King-bolt," "King-post," "King-penguin," "King-truss," &c.

That "Fond Father" necessarily means, or has always meant, an Affectionate Father

In Vol. VI. of the *International Library of Famous Literature*, pp. 2759—2772 will be found an excerpt from *The Schoolmaster*, by Roger Ascham, and published in 1570, on "The Bringing up of Youth" which is well worth reading and acting upon *now* (1923)! At pp. 2763-4 he uses the word "fond," and in each case the editor has put in square brackets after the word "foolish," to show that that is what Ascham meant by the word. Dr. Brewer, p. 476, *Phrase and Fable*, says, "Here fond does not mean affectionate, but silly." And the *Con. Ox. Dict.*, p. 318, gives "foolishly credulous" as the first meaning of "fond."

That the only meaning of "forlorn Hope" is that there is very little hope of something happening which we wish would occur

The *Con. Ox. Dict.* gives, "forlorn hope, n. Storming-party; desperate enterprise. [from Dutch *verloren hoop* lost troop (*hoop* = heap)]."

In Brewer's *Phrase and Fable*, p. 480, we find, "Cromwell says, 'Our *forlorn* of horse marched within a mile of the enemy,' *i.e.*, our horse picket sent forward to reconnoitre approached within a mile of the enemy's camp." While Prof. Ernest Weekley, M.A., in his *Romance of Words* (1912) at p. 119, says, "*Forlorn hope* is sometimes used metaphorically as though the *hope* were of the kind that springs eternal in the human breast. In military language it now means the leaders of a storming party, but was earlier used of soldiers

in any way exposed to special danger. Cotgrave has *enfans perdus*, ' perdus ; or the *forlorne hope* of a campe (are commonly gentlemen of companies).' It is from obsolete Dutch *verloren hoop*, where *hoop*, cognate with Eng. *heap*, is used for a band or company."

That the terms " Middy " and " Jack Tar " are in common use in the Royal Navy

" N.O.," writing to the *Daily Mail*, Aug. 17, 1916, said, " Sir—it is curious that people in speaking or writing about the Navy almost invariably use the terms ' Middy ' and ' Jack Tar ' as if they were terms of endearment familiar in the Service. I have yet to meet a naval officer who has been known to call a midshipman a ' Middy ' or a sailor a ' Jack Tar.'

" Midshipmen are usually called ' Snotties ' or ' Young Gentlemen,' or, surprising as it may seem, ' Midshipmen.' The first is a familiar term not to be used officially, whereas it would be quite proper and in order to speak of the ' Young Gentlemen ' even to that demi-god the captain.

" Sailors are generally known as ' Blue-Jackets,' or sometimes ' Matelots,' but never, never, never as ' Jacks ' or ' Tars,' or ' Jack Tars.' They would ' knock your blinkin' 'ead off ' if you displayed such crass ignorance of their tender feelings. Here again ' Blue-Jacket ' is quite an official term, whereas ' Matelot ' is generally used informally.

" Nowhere are there so many pitfalls to the uninitiated as in the Navy. There are innumerable traditions to be guarded and a hundred customs to be observed. But the British public, knowing nothing of these traditions and customs, ' keeps on smiling ' and—blundering. It speaks of our ' Middies ' and our ' brave Jack Tars ' with a swelling and a heaving chest, proud, Sir, aye, proud of the rascals. Don't do it, John Bull, don't do it. It isn't done in the Service. Isn't that enough ? "

That to Aggravate is to Annoy or Enrage a Person

" To *aggravate* is not to annoy or enrage (a person), but to make worse (a condition or trouble). The active participle should very rarely, and the rest of the active practically never, be used without an expressed object, and that of the right kind. In the sentence, *An aggravating circumstance was that*

the snow was dirty, the meaning is not that the dirt was annoying, but that it added to some other misery previously expressed or implied. But, as the dirt happens to be annoying also, the use is easily misunderstood, and is probably the origin of the notorious vulgarism ; since it almost inevitably lays a writer open to suspicion, it is best avoided."—H. W. and F. G. Fowler, p. 59, *The King's English.*

That the word " Belfry " is etymologically connected with " Bells "

Few things etymological seem more likely than that *bel*-fry should be derived from " bell," but Prof. Ernest Weekley, M.A., p. 152, *Romance of Words* (1912), says, " A *belfry* has nothing to do with *bells*. Old Fr. *berfroi* (*beffroi*) was a tower used in warfare. It comes from two German words represented by modern *bergen*, to hide, guard, and *Friede*, peace, so that it means 'guard-peace.' The triumph of the form *belfry* is due to association with *bell*, but the *l* is originally due to dissimilation, since we find *belfroi* also in Old French."

That " Benedict " is the correct spelling of the word meaning a converted Bachelor

Similarity of sound is obviously the cause of the confusion here. A *benedick* is a newly married man, especially if he has escaped matrimony until late in life. At p. 308, *The King's English*, we find, " In spite of the *Oxford Dic.*, the differentiation between the saint, Benedict, and the converted bachelor, Benedick, is surely not now to be given up." Dr. Brewer, *Phrase and Fable*, says, " BENEDICK. A sworn bachelor caught in the wiles of matrimony, like Benedick in Shakespeare's comedy of *Much Ado about Nothing*. BENEDICT. A bachelor, not necessarily one pledged to celibacy, but simply a man of marriageable age, not married. St. Benedict was a most uncompromising stickler for celibacy."

That the word " Buttery " is derived from the word " Butter "

" The *buttery* is not so named from *butter*, but from *bottles*. It is for *butlery*, as *chancery* is for *chancelry*. It is not, of course, now limited to bottles, any more than the *pantry* to bread or the *larder* to *bacon*, Fr. *lard*, Lat. *laridum*." " BUTTERY, n. Place in colleges, etc., where bread and ale, butter, etc., are kept ; *b.-hatch*, half-door over which provisions are

issued [from Old French *boterie* = *bouteillerie* (BOTTLE,-ERY)]." —*Con. Ox. Dic.*

That the words "Cutlass" and "Cutler" are derived from the verb "to cut"

Nothing seems more natural, and "it's so simple," as a well-known advertisement has it, but Prof. Ernest Weekley, p. 116, *Romance of Words* (1912), has, "French *coutelas*, an augmentative of Old Fr. *coutel* (*couteau*), knife, gave Eng. *cutlass*, which has no more etymological connection with 'cutting' than a *cutler*, Fr. *coutelier*, or a *cutlet*, Fr. *côtelette*, little rib, Lat. *costa*. *Cutlas* was popularly corrupted into *curtal-axe*, the form used by Rosalind :—

> *"A gallant curtal-axe upon my thigh,*
> *A boar-spear in my hand."*
> As You Like It, I., iii.

That the phrase "to run the Gauntlet" has some reference to Gauntlet, a Glove

This is what Prof. Ernest Weekley, M.A., says at p. 120, *Romance of Words*, "The military phrase *to run the gauntlet* has no connection with *gauntlet*, glove. The older form is *gantlope*. 'Some said he ought to be tied neck and heels; others that he deserved to *run the gantlope*.' (*Tom Jones*, vii., i.). "It is a punishment of Swedish origin from the period of the Thirty Years' War. The Swedish form is *gatlopp*, in which *gat* is cognate with Eng. *gate* in its proper sense of 'street,' and *lopp* with Eng. *leap* and Ger. *laufen*, to run.

The *Con. Ox. Dic.* under "Gauntlet" has, "pass between rows of men who strike one with sticks, cords, etc., as military, naval, or school punishment." A similar procedure used to be practised at the South African College in the author's day (1886) in the case of all first-year men on their joining the college. The whole of the graduates and undergraduates collected in the paddock (which was no small one!) and arranged themselves in a rough square. The new arrival then had to run round the paddock in front of the men while they pelted him for all they were worth with green acorns, a collection of the largest of these having been made previously. Acorns at the Cape were frequently 2 ins. long by $\frac{3}{4}$ in. diameter, so they made themselves well felt on tightly fitting nether garments, and the victim's dress used to be examined

first to make sure it was not unsuitably thick (or double !) for a warm climate !

That the first syllable of the word "Greyhound" refers to the Colour of the Dog

Prof. Ernest Weekley, M.A., p. 124, *Romance of Words*, says, "Ignorance of the true meaning of a word often leads to pleonasm. Thus *greyhound* means *hound-hound*, the first syllable representing Icel. *grey*, a dog."

That the place-name Hanwell is derived from St. Ann's Well

"DERIVATION OF HANWELL, MIDDLESEX.—There have been several repetitions lately of the absurd error concerning the origin of this place name. The latest occurs in 'N. & Q.,' *ante*, p. 305. To derive if from St. Ann's well is but a specimen of the punning gesswork so common among amateur etymologists. Do let us have this one nipped in the bud !

"This place was named Hanewell ('Cartularium Saxonicum,' ch. 1050) in Anglo-Saxon days, long before the corruption in our language which involves the dropping of the letter *h* set in with the Norman-French invaders.

EDWARD SMITH."

p. 377, *Notes and Queries*, Nov. 13, 1915.

That in the expression "Eat humble pie" the word "Humble" is etymologically connected with Humility

The letter "h" is often badly treated—either it is "dropped" or it is obtruded when it has no right to be present, so we have the 'Ighbury and Hislington 'bus. The present case is one of the kind, as will be seen from the following extract from Prof. Ernest Weekley's *Romance of Words*, p. 104, "*Humble-pie* is a popular perversion of *umble-pie*, *i.e.*, a pie made from *umbles*, or inferior parts of the stag. But *umble* is for earlier *numble*, Old Fr. *nomble*, formed, with dissimilation, from Lat, *lumbulus*, a diminutive of *lumbus*, loin. Thus *humble-pie* has etymologically no connection with humility."

That the word "Jenneting" in Jenneting Apple is derived from "June eating"

Prof. Ernest Weekley, M.A., p. 112, *Romance of Words*, says, "The apple called *jenneting*, sometimes 'explained' as for *June-eating*, was once spelt *geniton*, no doubt from French

jeanneton, a diminutive of *Jean*. It is called in French *pomme de Saint-Jean*, and in German *Johannis-apfel*, because ripe about St. John's Day (June 21). The modern form is due to such apple names as *golding, sweeting, codlin, pippin*."

That the word "Mews" has always been associated with Horses

> "*More pity that the eagle should be mewed,*
> *While kites and buzzards prey at liberty.*"
> Richard III., I., i., 130
>
> "*And, for his meed, poor lord, he is mewed up.*"
> Richard III., I., iii., 138.

Prof. Ernest Weekley, p. 111, *Romance of Words*, says, "From *muer*, to moult, Lat. *mutare*, we get Fr. *mue*, moulting, later applied to the coop or pen in which moulting falcons were confined, whence the phrase 'to *mew* (up).' When, in 1534, the royal *mews*, or hawk-houses, near Charing Cross, were rebuilt as stables, the word acquired its present meaning."

That the word "Mint" either means the Herb or the place where Coins are made

Prof. Ernest Weekley deals with this word in his *Romance of Words*, and from the *Cent. Dic.* we learn the word has also the following meanings: A coin; coin; coined money; money. A quantity such as a mint turns out; a great supply or store: as a *mint* of money. A place of privilege or asylum in Southwark, London, near the Queen's Prison, where persons sheltered themselves from justice. [The privilege is now abolished. This is mentioned to prevent overcrowding there!] To coin; stamp and convert into money. To invent; forge; fabricate. To aim; purpose; endeavour. And in Scotland, to insinuate; hint.

That by derivation the word "Omelet" is connected with Eggs

From a culinary point of view we cannot have an omelet without at least one egg, but Prof. Ernest Weekley (and the *Con. Ox. Dic.* agrees) tells us p. 126, *Romance of Words*, "French *omelette* has a bewildering history, but we can trace it almost to its present form. To begin with, an *omelet*, in spite of proverbs, is not necessarily associated with eggs. The origin is to be found in Lat. *lamella*, a thin plate, which gave

Old Fr. *lamelle*. Then *la lamelle* was taken as *l'alamelle*, and the new *alamelle* or *alemelle* became, with change of suffix, *alemette*. By metathesis this gave *amelette*, still in dialect use for which modern Fr. has substituted *omelette*. The *o* then remains unexplanied, unless we admit the influence of the old form *œuf-mollet*, a product of folk-etymology."

That the word "Pay" in the phrase "The Devil to pay" refers to some monetary transaction

On this fallacy Prof. Ernest Weekley, p. 149, *Romance of Words*, states, "When Jack Bunce says, 'There will be the devil to *pay*, and no pitch hot' (Scott, *The Pirate*, ch. xxxviii.), he is using a nautical term which has no connection with Fr. *payer*. To *pay*, *i.e.*, to pitch, is from Old Fr. *peier* or *poier*, Lat, *picare*, from *pix*, pitch."

That the derivation of the term "Press Gang" is from "pressing" or "forcing" men into the Navy or Army

This is an excusable mistake on which Prof. Ernest Weekley says at p. 120, *Romance of Words*, "The *press-gang* had originally nothing to do with 'pressing.' When soldiers or seamen were engaged they received earnest money called *prest*-money, *i.e.*, an advance on 'loan,' Old Fr. *prest* (prêt), and the engagement was called *presting* or *impresting*. Florio explains *soldato*, literally 'paid,' by '*prest* with paie as soldiers are.' The popular corruption to *press* took place naturally as the method of enlistment become more pressing." The word *imprest* is still in use, and means money advanced to any person (not necessarily connected with the Navy or Army) to be used in State business.

That the word "Rights" in "Marital or Conjugal Rights" means Legal Rights

In the above phrase the word should be (and formerly was) written "rites," meaning form of procedure; ceremony. Vide *Notes and Queries*, May 16, 1891, and p. 25 of *Married Love* (1918), by Dr. Marie C. Stopes, D.Sc., Ph.D. In the term "women's rights" the spelling is different and so is the meaning.

That the Sedan Chair was named after the town of Sedan in France

At p. 61 of *The Romance of Engineering* (1892), by Henry Frith, "The sedan-chair is but a modern imitation of the litter

or ' chair.' The reason for the name is uncertain, but it did not emanate from Sedan town. Mr. G. A. Sala suggests that it was so named from the peculiar cloth called ' sedan,' with which these conveyances and gondolas were lined." This cloth, according to the *Century Dic.*, was made at Sedan. Prof. Ernest Weekley, M.A., p. 48, *Romance of Words*, says, " Early etymologists connected the *sedan* chair with Sedan. Such guesses are almost always wrong." Dr. Cobham Brewer, p. 1118, *Phrase and Fable*, gives the derivation as from Latin *sedes*, a seat, and states that the chair was introduced into France in 1617 by the Marquis de Montbrun, and called *chaise à porteurs*. " It is generally said that these chairs were first made at Sedan, on the Meuse ; but this is not at all probable, as, without doubt, the invention was introduced into France from England."

That the word " Strawberry " is derived from the fact that Straw is often used in the cultivation of the fruit

The *Con. Ox. Dic.* gives the meaning of the first syllable as *strew*, *i.e.*, the runners of the plant are *strewed* over the ground, and Mr. C. E. Clark gives the same explanation.

The *Cent. Dic.*, " *Straw* may be taken in the sense of 'a long stem ' referring to the runners of the plant, or it may allude to an old habit of stringing the berries on a straw. The word is often erroneously explained as a corruption of a supposed *strayberry*, or even as referring to the common use of straw or hay about the plants to keep the earth from soiling the berries."

That a Temple was a Meeting Place for Worship

" The temple is an institution common to religions of natural growth which have reached a certain stage, and in most languages bears a name expressing that it is the house or palace erected by men as a habitation for their god. In this connection the term ' house of God ' has quite a different sense from that which we connect with it when we apply it to a Christian place of worship. A temple is not a meeting-place for worshippers ; for many ancient temples were open only to priests, and, as a general rule, the altar, which was the true place of worship, stood not within the house, but before the door. The temple is the dwelling-house of the deity to which it is consecrated, whose presence is marked by a statue or other sacred symbol."—*Ency. Brit.*, XXIII, 165.

That the word "Tobacco" is derived from Tobago (the island)

"*Tobacco* does not take its name from the island of Tobago, but from the native name of the tube through which the Caribs smoked it."—Prof. Ernest Weekley, p. 181, *Romance of Words*.

That the correct pronunciation of the word "Viking" is Vi-King

It is *vĭk'-ing*, and the exact meaning of *vik* is doubtful.

That the word "Camelopard" is derived from Camel and Leopard

The meaning *is* a combination of these two animals, but the *word* is derived from camel + pard, pard meaning leopard !

That the word "Celt" has only one meaning—the early Inhabitants of Scotland and parts of Britain

Celt, pronounced kelt, means the race. Celt, pronounced selt, means a flint implement.

That Chastise has always meant "Beat"

Mr. Justice Darling, in a case reported in the daily Press of April 21, 1923, said, "The term chastise has given rise to a great deal of misapprehension. It probably meant *castigatio*, meaning to rebuke a wife and point out the error of her ways."

The *Cent. Dic.* gives, "To discipline ; instruct ; correct the errors or faults of," as former meanings of chastise.

That the Cross carried before an Archbishop is rightly called a Crosier

"The original meaning of the word was 'one who bears the crook,' and about the 15th century came to be used of the crook itself, and continued so till early in the 19th century when it became, by what one writer calls 'this tiresome modern blunder,' confused with the cross.

"The Old English word for a crook or hook was croce, croche, crose, and, later, crosse ; but still meaning *a crook* and not confused with crois, croys, croyce, *a cross*.

"'There is no ancient authority whatever for applying this term crosier to an archbishop's cross, which is something entirely apart from and of different significance to the croce, crosier, or pastoral staff which an archbishop uses in common with his suffragans as a symbol of his episcopal office.'

" Crochet-hook, of course, is nearly related and points to the true meaning—a hook. See article by Rev. Fowler, *Archæologia*, Vol. 52. DONALD GUNN."

That the correct pronunciations of the place-names Grantham and Petersham are Granth-ham and Peter-sham

They should be pronounced Grant'-ham and Peters'-ham. Ham = a village. Hamlet = a little village. Vide *On Hyphens*, by H. W. Fowler, p. 13.

That Gunnersbury denotes the Town or Dwelling of Gunner

" Gunnersbury: Ruislip.—Johnston's *Place-Names of England and Wales* states that the name 'Gunnersbury' denotes the town or dwelling of Gunner, the English form of Norwegian Gunnair, and that its earliest occurrence dates from the fifteenth century; while the modern 'Ruislip,' represented by an archaic *Ryselippe*, is explained as the leap of Ruga, a hypothetical individual of whose actual name earlier forms are desired. Both these conjectures can now be dismissed as erroneous.

" In a letter of great historical value to *The Times Literary Supplement* Mr. J. Harvey Bloom, after an examination of certain unpublished records at Compton Verney belonging to Lord Willoughby de Broke, gives minute details concerning the estates owned in 1380 by Alice Perrers, the reputed mistress of Edward III., and her husband, Sir William de Wyndesor, situated in fifteen different counties, among which are mentioned 'the manors of Rischlep and Gunnoldsbury' in the County of Middlesex. Hence it follows that Gunnersbury derives its name from an early settler in the Ealing district called Gunnold or Gunnild, synonymous with the Norwegian Gunhild, or Gunhilda, which, like the Wagnerian Brynhild or Brunhilda is a woman's name; and that the word Ruislip is compounded of A.-S. *rusc*, M.E. *risce*, a rush + *hlyp*, a leap, also an enclosure, as in Rishangles, Rishton, Rissington, Hindlip, Islip, &c.

" This discovery well illustrates the importance of research among the earliest available records for all disputed place-names, and the too common fallacy of attributing the majority of such names to an eponymous or tribal Teutonic source.—N. W. Hill, 35, Highbury Place, N."—*Notes and Queries*, 12 SV., p. 231, Sept., 1919.

That it is Correct to write Magna Charta

The correct forms are *Magna Carta* (Latin) and *The Great Charter* (English).

Profs. C. Oman and Cyril Ransome, of course, use these forms correctly.

That a Monkey-tree is so named because its Branches look like the Tails of Monkeys

Monkey-puzzler = Chilipine = *Araucaria imbricata.*

"The Monkey-puzzle Tree.—This name is said to have originated from a remark made by Charles Austin while he was watching the planting of one of these trees at Pencarrow in Cornwall, the seat of Sir William Molesworth, where many rare trees were planted for the first time. 'How that tree would puzzle a monkey!' he exclaimed, and the expression stuck.

"The source of this information is an obituary notice of Mrs. Richard Ford, sister of Sir William Molesworth and subsequent owner of Pencarrow, which appeared in *The Times* after her death, at the age of 95, in 1910.—Gerald Loder." —*Notes and Queries*, Dec. 9, 1922, p. 474.

"The Monkey-Tree.—Until quite recently I always heard this tree called the monkey-puzzler, and this is the form used by Kipling in his short story, 'The Puzzler' ('Actions and Reactions'). Is 'monkey-puzzle' a more recent form? A cousin tells me that he has not heard it except from a young friend in the early twenties, and I have heard it only from one still younger.—G. H. White, 23, Weighton Road, Anerley." —*Ibid.*, Jan. 20, 1923, p. 58.

That the only Meaning of the Word Seraphim is "Angels"

Seraphim is the plural of seraph.

"*Isaiah* VI., 2. Here only in Old Testament the word denotes supernatural beings. It is derived from the verb 'to burn,' and may simply indicate the fiery or glowing appearance of Jehovah's attendant angels (*Ezekiel* I., 13, 14). Elsewhere, however, the same word stands for venemous serpents (*Numbers* XXI., 6; *Isaiah* XIV., 29; XXX. 6), and it may in *Isaiah* VI., 2, be intended to convey the meaning that guardians of Jehovah's throne are of serpentine form. This is scarcely borne out by the context (vv. 6 and 7), though in Ezekiel's vision of heaven, animal forms are introduced. *Ezekiel* I., 10."—Dummelow's *Commentary.*

That the word "Spinet" is derived from *Spinetta*, dim. of *Spina*, a Thorn, or Spine.

N. W. Hill wrote at p. 55, *Notes and Queries*, Jan. 15, 1916, 'Though the 'N.E.D.' does not positively discard the hitherto accepted derivation of this word as given by various authorities from Scaliger to Skeat, viz., from Ital. *spinetta*, diminutive of *spina*, a thorn or spine (pointed crowquills being sometimes used in the construction of the keyboard of the instrument), this theory can now, I think, be dismissed as conjectural and obsolete. That is the idea one gets, at any rate, from a perusal of the article on the spinet in Grove's *Dictionary of Music and Musicians*. It is there pointed out that in 1876 a musical work was discovered in Italy called *Conclusioni nel suono dell' Organo*, by D. Adriano Banchieri, published at Bologna in 1608, in which the following statement occurs:

"Spinetto riceve tal nome dall' inventore di tal forma longa quadrata, il quale fù un maestro Giovanni Spinetti, Venetiano, ed uno di tali stromenti hò veduto io alle mani di Francesco Stivori, organista della magnifica communità di Montagnana dentrovi questa inscrizione: *Joannes Spinetus venetus fecit A.D. 1503.*"

That Toadstools are so named because Toads are supposed to like to sit on them.

"Toadstools have nothing whatever to do with toads, the name being either a mistaken application or humorous perversion of the German *tod* and *stuhl*, meaning death-stool, in reference to the poisonous nature of these fungi."—C. E. Clark, p. 39, *Mistakes We Make.*

GEOGRAPHY

That the Rhone passes through the Lake of Geneva with such Velocity as not to mingle with its waters

JOHN TIMBS, F.S.A., *Popular Errors* :—

" John Evelyn in his *Diary* repeats the so-often-repeated assertion that the Rhone passes through the Lake of Geneva with such velocity as not to mingle with its waters. Of all the fables which credulity delights to believe and propagate, this should appear the most impossible to obtain belief ; for the Rhone, when it enters the lake, is both the colour and consistency of pea-soup, and it issues out of it perfectly clear, and of so deep a blue that no traveller can ever have beheld it without astonishment. Evelyn had seen it in both places, and yet repeats the common story, which, had it been fact instead of fable, would have been less remarkable than the actual, and as yet unexplained phenomenon of its colour at Geneva."

Prof. Tyndall's explanation of the colour is that it is due to the large number of very fine particles of matter in suspension, and he verified this by experiment.

That there is no tide in the Mediterranean Sea

There is a tide, though it is considerably less than in the Atlantic Ocean. Near Venice it amounts to 3 ft., but off the island of Zante the rise is only 9 inches.

That British Honduras and the Republic of Honduras are the same country

Merely definitely stating the fallacy is almost enough to disprove it, for the words " British " and " Republic " make further confusion unlikely. In fact, perhaps it would be better to state the fallacy thus : " that there is only *one* territory named Honduras."

" SIR,—There is good reason for changing the name ' British Honduras.' Kindly help this British Colony by publication of this letter.

" Ninety persons in every hundred confuse this with the Republic of Honduras, with its unenviable notoriety, and in

consequence credit in the British Colony is seriously affected and commercial men fight shy of the very name.

"Why not change the name to St. George's Colony, with Elgin City as the capital, instead of Belize? The country came under British rule by the battle of St. George Cay, when it was taken from Spain, and is not St. George Britain's patron saint, and the heir-apparent, George?

THOMAS FENWICK,
"Author of *John Bull and His Babies*,
"311, Third Avenue, New York, U.S.A."
—*Daily Mail*, Sept. 23, 1907.

That the Water of all Waves has a motion of Translation

The subject of waves is a vast one, and I feel in danger of being accused of temerity in attempting to deal with any portion of it in a few short paragraphs.

There are at least four classes of waves in connection with water: (1) oscillatory waves, (2) ripples, (3) waves of translation, and (4) sound waves. An oscillatory wave may be taken to be one out at sea of which the crest does not break. If a thin stick be passed sideways under a thick tablecloth, and between it and the table, we have an illustration of an oscillatory wave. In such waves the water has no motion of translation.

Ripples are distinguished from oscillatory waves by the laws governing their velocity. They are very small, and surface tension plays an important part in their formation.

Sound waves are not the kind of waves we are dealing with, though in their case, too, there is no motion of translation beyond the local motion of oscillation of the air.

Lastly, we have the waves of translation, which are the only ones that at all justify the popular belief.* Even these are usually oscillatory waves at first, for an oscillatory wave breaks on a shelving shore when its height is about equal to the depth of water, and then forms a wave of translation. As most ocean waves belong to the oscillatory class, and ripples cover another large class, we are justified in saying that as a rule the water of waves does not travel. The mistake has arisen through an optical illusion, for the waves *appear* to travel along. An excellent example of a similar illusion occurs in connection with many kinetic illuminated advertise-

* Namely, that the water travels with the wave.

ments. Something seems to run along the electric light bulbs, but doesn't. They are merely dimmed or switched off and on in rapid succession.

That the Colorado Cañons are due to Volcanic Action

". . . maintaining the supreme importance of denudation in the configuration of land surfaces and particularly the erosion of valleys by the action of running water. This view, now universally accepted, met with opposition from the old-fashioned school, who held that the main features of the earth's surface were determined by cataclysms of Nature. . . while the cañons of Colorado confirmed his long-standing views on erosion."—Sir Archibald Geikie, K.C.B., F.R.S., in *Ency. Brit.*, 10th ed., XXVIII., pp. 609-610.

The chief cañon is 200 miles long and for the greater part of this has nearly vertical walls from 2,000 to 6,000 ft. in height!

That the Sahara Desert is the Bed of an Ancient Inland Sea, and that it consists of a vast Uniform Expanse of Sand

" It was long customary to assert that the Sahara was the bed of an ancient inland sea, and that it consisted of a vast, uniform expanse of sand, swept up here and there into ridges by the wind. But this idea is utterly erroneous. . . The surface, instead of being uniform and depressed below sea-level, is highly diversified, and attains in one place an altitude of fully 8,000 ft."—*Cham. Ency.*

" It is by no means all sand, as the old travellers' tale had it, but is of very varied surface. . . "—*Harms. Ency.*

That there exists in an extended region of the North Atlantic a Mass of Seaweed [The Sargasso Sea], so dense in parts as to be a Serious Hindrance to Navigation

Humboldt (*Cosmos*, 1849, Vol. I., p. 313) writes, " the Sargasso Sea, or that great bank of weeds which so vividly occupied the imagination of Christopher Columbus, and which Oviedo calls the seaweed meadows."

Dr. (and Commander) M. F. Maury, in his *Physical Geography* (1864), p. 100, writes, " Columbus passed through it on his first voyage of discovery to America. His crew were alarmed at it, for in places it is so thickly matted over with brownish weeds as to hide the face of the sea, presenting some-

what the appearance of a drowned meadow and looking as though you might walk on it without sinking more than shoe-deep in water." Apparently neither of these distinguished authorities visited the spot, and in the *Cyclo. of Names* (1905), p. 898, we find, "There existed no such delimited fucus-bank as was supposed by Humboldt, but merely areas where the *Sargassum bacciferum* was most abundant."

The *Cent. Dic.* and *Cham. Ency.* give the old story in its worst form ! while there is also a novel *In the Sargasso Sea*, by Thos. A. Janvier (Lond., 1898), ". . . the vast accumulation of *Sargassum bacciferum* and other floating seaweeds swarms with a life vegetable and animal peculiarly its own, and presents one of the most remarkable features in the geography of the Atlantic. . . ."

" The seaweed growing and matting together forms a Sargasso Sea of greater or less extent and thickness, according to the stillness and temperature of the water."—David Page, LL.D., F.G.S., p. 156, *Physical Geography*, 3rd ed., 1883.

Against all this we have the following which appeared at p.931 of *The Literary Digest* (of America) of Nov. 19, 1910 :—

" The Sargasso Sea Lost

"The recent Norwegian expedition sent out to search for the Sargasso Sea has returned with the tidings that ' there ain't no such a place.' The expedition, in fact, resembled one dispatched to look for mermaids, the sea-serpent, or the island of Ogyggia. Seaweed indeed it found, as might have been expected, but no such romantic conditions as have been reported for the last few centuries by veracious travellers and enshrined in marine literature."

Says *Cosmos* Paris(,Oct. 15) :—

" ' Another legend has disappeared, reduced to zero by the investigations of scientific explorers. Of old, sailors have reported that in an extended region of the North Atlantic there existed, under the name of the Sargasso Sea, a mass of marine plants so dense and thick that sailing-ships venturing therein were held indefinitely without power to free themselves. The great American nautical meteorologist Maury, whose works have been so useful to navigation, had himself accepted these assertions without verifying them.

" ' The Norwegian department of fisheries has recently sent out, on the ship *Michael Sars*, a scientific expedition to study the Sargasso Sea. *Le Yacht* gives the results as follows :—

"'Approximately, the position of the sea coincides with that of the anticyclone which generally exists over the North Atlantic. Around this centre of high pressure the wind and the surface-currents of the sea circulate in the direction of the hands of a watch.

"'It is to the south of the fortieth parallel of north latitude, between the meridians of the Azores and Charleston, that there is the greatest chance of finding seaweed, which hardly descends below the tenth parallel, except in the vicinity of the Gulf of Mexico. The quantity of the seaweed to be seen is largest during the third quarter of the year, a little after the season of greatest frequency of the hurricanes common in the Mexican Gulf.

"'These algæ float on the surface about five or six months, after which they grow old and sink to the bottom. But the descriptions of floating prairies arresting the course of vessels are, according to the Norwegian expedition, quite fantastic.—*Translation made for The Literary Digest.*'"

Sir H. H. Johnston, G.C.M.G., K.C.B., in Part I. of *Wonders of Land and Sea*, Oct. 8, 1913, wrote, "The *Michael Sars* expedition of 1910-11 disposed of the credibility of these legends, or, at any rate, it is thought to have done so."

"An amazing amount of fiction and nonsense has been written about the sargasso-weed, but the truth is actually more unbelievable."—Sir Arthur E. Shipley, G.B.E., D.Sc., F.R.S., pp. 23-6.—*The Voyage of a Vice-Chancellor.*

That Mt. St. Elias is the Highest Mountain in North America

Mount St. Elias is situated by the Canadian frontier of Alaska and used officially to be thought the highest mountain in North America at a time when its height was taken to be 19,500 ft., but in 1892 it was found to be only 18,023 ft., which is lower even than Mount Orizaba (18,340 ft.), and now there are two known to be higher than this. Some readers may remember that a few years ago a certain Dr. F. A. Cook made the claim that he had reached the North Pole. He also claimed to have ascended Mount McKinley in North America. Both claims remain unsubstantiated. A party of explorers led by Thos. Lloyd reported that they had reached the summit of Mount McKinley on April 3, 1910, their expedition having left Fairbanks, Alaska, on Dec. 22, 1909, for the purpose of verifying or disproving Dr. Cook's claim that he had ascended that mountain. They found the height

to be 20,464 ft. Thus Mount McKinley is easily the highest in North America, and Mount Logan (named after Sir William Logan, the founder of the Canadian Geological Survey), which is 19,514 ft. high, is the second highest. It is in Yukon, Canada, and 40 miles North East of Mount St. Elias. Mr. Thos. Lloyd's party found no evidence of Dr. Cook having ascended Mount McKinley.

That the Egypt of the Maps is really the Egypt of Ancient and the present times

Prof. George Rawlinson, M.A. (Camden Professor of Ancient Hist. in the Univ. of Oxford), in his *Egypt* (11th edition), which was written with the collaboration of Arthur Gilman, M.A., after defining the boundaries of Egypt says, " It may be objected to this description, that the Egypt, which it presents to the reader is not the Egypt of the maps. Undoubtedly it is not. The maps give the name of Egypt to a broad rectangular space which they mark out in the north east corner of Africa, bounded on two sides by the Mediterranean and the Red Sea, and on the two others by two imaginary lines which the mapmakers kindly draw for us across the sands of the desert. But ' this Egypt,' as has been well observed, ' is a fiction of the geographers, as untrue to fact as the island Atlantis of Greek legend, or the Lyonnesse of mediæval romance, both sunk beneath the ocean to explain their disappearance. The true Egypt of the old monuments, of the Hebrews, of the Greeks and Romans, of the Arabs, and of its own people in this day, is a mere fraction of this vast area of the maps, nothing more than the valley and plain watered by the Nile, for nearly seven hundred miles by the river's course from the Mediterranean southwards.' * The great wastes on each side of the Nile are in no sense Egypt, neither the undulating sandy desert to the west, nor the rocky and gravelly highland to the east, which rises in terrace after terrace to a height, in some places, of six thousand feet."

Egypt proper, that is the Egypt of marvellous history and astounding architecture, is the Nile valley, with the Fayoum and the Delta.

At p. 6 Prof. Rawlinson says, in writing of the annual rising and falling of the Nile, " The Land thus left exposed is Egypt—Egypt is the temporarily uncovered bed of the Nile,

* R. Stuart Poole, *Cities of Egypt*, p. 4.

which it reclaims and recovers during a portion of each year, when Egypt disappears from view, save where human labour has by mounds and embankments formed artificial islands that raise their heads above the waste of waters, for the most part crowned with buildings."

Mr. E. M. Dowson, A.C.G.I., A.M.I.C.E., late Surveyor-in-Chief, and now Financial Adviser to the Government, Egypt, writing on Dec. 30, 1913, said, "The area of the country dealt with is about 300,000 sq. kilometres. This is the area of Egypt including desert. The cultivated area . . . is about 30,000 square kilometres."

That a Volcano is a Burning Mountain, from the Summit of which issue Smoke and Flames

"Such a statement as this, it is probable, does not unfairly represent the ideas which are, even at the present day, popularly entertained upon the subject. . .

"The description which we have quoted is not merely incomplete and inadequate as a whole, but each individual proposition of which it is made up is grossly inaccurate, and, what is worse, perversely misleading. In the first place, the action which takes place at volcanoes is not 'burning,' or combustion, and bears, indeed, no relation whatever to that well-known process. Nor are volcanoes necessarily mountains at all; essentially, they are just the reverse, namely, holes in the earth's crust or outer portion by means of which a communication is kept up between the surface and the interior of our globe. When mountains do exist at centres of volcanic activity, they are simply the heaps of materials thrown out of these holes, and must therefore be regarded not as the causes but as the consequences of the volcanic action. Neither does this action take place at the 'summits of volcanic mountains, when such exist, for eruptions occur quite as frequently on their sides or at their base. That, too, which popular fancy regards as 'smoke' is really condensing steam or watery vapour, and the supposed raging 'flames' are nothing more than the glowing light of a mass of molten material reflected from these vapour clouds."—Prof. John W. Judd, F.R.S., pp. 1 and 2, *Volcanoes*.

In the case of the very violent action of the volcano on the island of Sakura-jima in the South of Japan, which took place on Jan 14, 1914, it was reported that the west side of the

mountain blew out. " Almost every newspaper report of a volcanic eruption contains a reference to ' flames and smoke ' issuing from ' the burning mountain,' though this description of the phenomena is completely inaccurate. During an eruption there is practically no flame, and certainly none that can be seen except close to the crater; no smoke such as issues from a chimney is ever produced; and there is no burning in the ordinary sense of combustion as in a fire. These elementary facts have been taught to thousands of school children for the past twenty years, yet popular writers and journalists seem still to be unaware of them."—Sir Richard Gregory, D.Sc., F.R.A.S., p. 205, *The Illuminating Engineer*, May, 1915.

On June 4, 1915, there were exhibited at the Royal Institution two folio volumes, entitled :—

" Campi Phlegræi,

Observations on the Volcanoes of the two Sicilies. As they have been communicated to the Royal Society of London by Sir William Hamilton, K.B., F.R.S., 1776."

and the Supplement thereto :—

" Being an Account of the Great Eruption of Mount Vesuvius in the Mont (*sic*) of August, 1779."

They are illustrated by a number of highly coloured plates, which it is stated were made under the supervision of the distinguished author. After looking at these plates it is not hard to realise why many think fire and smoke issue in huge volumes from volcanoes—in fact, it would be impossible to come to any other conclusion from them. Another interesting feature is that in at least two of them our old friend zigzag lightning is shown playing about the crater! Sir William was the husband of the celebrated Lady Hamilton.

C. G. Abbot, in describing the photo of the grand eruption of Colima (13,000 ft.), in Mexico, taken on March 7, 1903, speaks of the column of *ashes* as rising to a height of about *17 miles*!

Prof. T. G. Bonney, Sc.D., F.R.S., p. 61, *The Structure of the Earth*, says, " From these marginal craters a cloud of steam, blackened with volcanic dust and scoria, is ejected." And at p. 71, " but the most terrible feature was the sudden discharge of an enormous quantity of extremely hot dust, which was more fatal than any plague of Egypt to herb and tree, to beast and man."

That Volcanic Action used to be much Greater than it is now

Prof. J. W. Judd, F.R.S., in his work entitled *Volcanoes* (International Scientific Series), has much to say on this matter, and he sums up the case thus : " Hence, although we may not be able to prove the fact by any mathematical demonstration, a strong presumption is raised in favour of the view that the subterranean energy in the earth's crust is a constant quantity, and that the only variations which take place are in the locality of its manufacture. . . Many independent lines of evidence all point to the inference that these [very early] volcanic ejections are not the result of one violent effort, but are the product of numerous small outbreaks which have been scattered over enormous periods of time."—3rd ed., p. 278. Sir Archibald Geikie, F.R.S., arrives at the same conclusion in his article in the 10th ed. of *Ency. Brit.* Prof. T. H. Huxley, F.R.S., p. 193, *Science and Hebrew Tradition*, says, " To prevent misunderstanding perhaps I had better add that I do not believe one whit in astrology ; but no more do I believe in Ptolemaic astronomy or in the catastrophic geology of my youth, although these, in their day, claimed—and to my mind rightly claimed—the name of science." While at p. 283 he says, " With respect to such inundations as are the consequences of earthquakes and other slight movements of the crust of the earth, I have never heard of anything to show that they were more frequent and severer in the quaternary or tertiary epochs than they are now. In the discussion of these, as of all other geological problems, the appeal to needless catastrophies is born of that impatience of the slow and painful search after sufficient causes in the ordinary course of nature which is a temptation to all, though only energetic ignorance nowadays completely succumbs to it."

The following account of the eruption of a volcano in the south of Japan supports the statements of Sir Archibald Geikie and Profs. Huxley and Judd :—

" Yesterday (Wednesday) evening the west side of the volcano of Sakura-jima blew out.

" All sides of the volcano and the summit are vomiting fire furiously.

" The sea is boiling, and a tidal wave has swept the city again.

" Yesterday evening earthquakes destroyed houses, roads, and railway. For miles the aspect of nature has completely altered.

"The fall of ashes is so heavy that it is almost impossible to open one's eyes. The Observatory predicts further and worse eruptions. Some 13,000 houses have been destroyed.

"Over 70,000 persons have fled or are missing."

"These sentences, contained in a Reuter telegram from Tokio, describe the fate that has overtaken the island of Sakura-jima, in Southern Japan, and the neighbouring city of Kagoshima, on the mainland. The message continues :—

"An enormous rent appeared in the side of the volcano. Thick smoke and fire were rising a thousand feet in the air. Three other rents became visible, from which huge red-hot rocks were flung. Flames enveloped the island.

"Rain of Fire.

"This was followed by a terrific eruption from the summit. The sky seemed to rain fiery substances. The eruptions were accompanied by thundering noises. From the mainland watchers saw the inhabitants running to the seashore seeking means of escape. Boats from Kagoshima fetched refugees and returned loaded to overflowing. Gunwales were clasped by dozens of people clinging with one hand. Many inhabitants attempted to swim across, but most of them were drowned or suffocated.

"In Kagoshima the earthquakes wrecked buildings. The shower of rocks and stones caused houses to collapse. There was a hail of volcanic matter. Trains took away the refugees. Fugitives clung on the outside of the trains like flies. The number of dead will probably never be known.

"A message from Nagasaki says that at the time of the disaster the population of Sakura-jima was about 12,000, of whom about 5,000 have been accounted for. About a hundred thousand are homeless on the mainland. All foreign missionaries are safe.

"Blocks of lava stone blocked the railway 230 miles away and ashes fell at Yokohama and Tokio. A foreigner from the district says that blocks of lava the size of houses were thrown up. The principal volcanoes throughout Japan are active, but no further disaster is feared, Sakura-jima being regarded as a safety valve.—Reuter's Special."—*Daily Mail*, Jan. 16, 1914.

"Sydney (N.S.W.), Wednesday.

"The steamer *Makambo*, which has arrived here, reports that the whole face of Ambrym Island (New Hebrides, Southern

Pacific) has been altered as the result of the volcanic eruption there last month.

" The site of the mission hospital is now fathoms beneath the sea, while there are two miles of hilly country where there was previously sea. During the eruption the sea was boiling, and turtles and fish rose to the surface cooked.

" Dr. Bowie, the principal missionary on Ambrym Islands, says one by one the mountains burst into flames, until ten volcanoes were emitting molten lava. There was no panic among the natives, who numbered 2,500, in the threatened districts, but over 100 people perished. Some natives were drawn into the streams of lava and others were blown away in the boats in which they had taken refuge, and were drowned or boiled in the sea.—Reuter."—*Daily Mail*, Jan. 22, 1914.

The following is an account of another volcano :—

" Weltevreden (Java), June 4.

" Mount Kloet, Java, was in eruption on the night of May 19, and the next morning the country within 50 miles of it was darkened by a thick rain of ashes.

" Telegraph and telephone communication was interrupted but was partly re-established after 12 hours' work.

" The volcano, it was then learned, threw out the total contents of a crater-lake covering half a square mile and 300 yards deep. The crater bank gave way, and a red-hot lava stream, mixed with mud and steaming water, flooded many inland native villages, and overran the town of Blitar, tearing down everything in its path. The inhabitants suddenly awoke to find a brown boiling current eight miles broad, and died miserably, half buried, half drowned. The aspect of the country changed into a mud lake resembling no man's land in Flanders in the winter. Twelve villages were destroyed. Twenty-one miles of railway disappeared. Sugar plantations suffered heavily. The swollen rivers are bringing down the bodies of natives. The military and civil medical service and private doctors are treating thousands of injured in the field hospitals. Soldiers are cutting out corpses from the stone-hard lava. It is estimated that there are 50,000 dead. The newspapers have opened subscriptions to relieve the distress."—*Daily Mail*, June 14, 1919.

There is an excellent series of books called " Shown to the Children "; one of these is *The Earth Shown to the Children*, by Elison Hawks, and at pp. 66-7 there is a quotation from Sir Robert Ball's, *The Earth's Beginning*. " . . . . By

10 o'clock on the morning of Monday, August 27, 1883, the rehearsals were over and the performance began. An overture, consisting of two or three introductory explosions, was succeeded by a frightful convulsion which tore away a large part of the island of Krakatoa and scattered it to the winds of Heaven. In that final effort all records of previous explosions on this Earth were completely broken. This supreme effort it was which produced the mightiest noise that, so far as we can ascertain, has ever been heard on this globe." The sound was heard on the Island of Rodriguez, nearly 3,000 miles away, and it took slightly more than 4 hours to travel that distance, while the height of the column projected from the volcano on Aug. 26 was measured as *17 miles*. Krakatoa is in the East Indies, South of the Island of Sumatra and between it and the Island of Java. This eruption is described in detail by C. G. Abbot, Director of the Astrophysical Observatory, Smithsonian Institution, in the *National Geographic Magazine* of Feb., 1913. In the eruption of Mount Colima in Mexico, 13,000 ft. high between Feb. 15 and Mar. 24, 1903, the column of ashes also reached about 17 miles high.

On May 8, 1902, the town of St. Pierre and 30,000 inhabitants were annihilated by an eruption of Mt. Pelée, W. Indies.

That the Bay of Biscay is Frequently and Unusually Rough

There may be some difficulty in persuading a poor sailor who has once crossed the Bay when it has been rough, that this is a fallacy, but the evidence is strongly in favour of it being a mistaken view. It probably originated in the old days of sailing-ships which were not only much more at the mercy of the wind and waves than are steamers, but which used to hug the shore of the Bay and (if there were any sea at all) had a bad time of it when going round the re-entrant corner by Bayonne and S. Sebastian. When the author was returning from Portugal in Feb., 1913 (fourth crossing, all smooth), it was decidedly rough on leaving Lisbon in the S.S. *Lanfranc*, and fearing that the Fates were going to have their revenge for our throwing doubt on the state of the Bay we somewhat nervously inquired of the steward how much rougher it would be in the Bay. "We don't take any more notice of the Bay, Sir, than we do of the Mersey. I have crossed 30 or 40 times and it has been rough only once. Owing to the variable winds it used to be a serious matter in the old days for sailing vessels." Next morning (Feb. 28,

1913) the steward came into the cabin and said, "This is the Bay there is so much talk about." This remark was called forth by the fact that, in spite of the roughness the previous day, when only 25 per cent. of the passengers attended meals, the sea was perfectly smooth, and at dinner that night we filled a wine glass brimming full of water and left it on the table during dinner without a drop of it being spilled! One of the passengers was Mr. A. A. Froude, C.M.G., nephew of the historian of that name, and he told the author that he had crossed the Bay 19 times, of which it was very rough only 3 times, while on 4 of the crossings they had strong winds. All the 19 crossings were made in Feb. or March. Another passenger was Mr. S. H. Davies, F.C.S., who said he had crossed 12 times and only on one occasion was it really rough.

In dealing with this fallacy in the issue of Jan. 22, 1912, the *Daily Mirror* had the following paragraphs :—

"Though many travellers have found sorrow in the Bay of Biscay, it is probable that its evil reputation is responsible for much of the sea-sickness between Ushant and Vigo, for large numbers of travellers affirm that the winds in the Bay roar there no louder than any sucking dove.

"A well-known peer who has made the crossing of the Bay to and from the Canaries no fewer than thirty times was most indignant that the Bay of Biscay should be called rough.

"'It is like a mill pond,' he told *The Daily Mirror* yesterday. 'In all my experience I never met a sea with pleasanter manners. A little freshness in the breeze, maybe, and white caps on the waves, but rough—goodness me, never!' Another traveller—a business man just returned from a holiday in Madeira—said he had the smoothest voyage on the sea of his life. 'It was bright and calm,' he said. 'I could not have wished for pleasanter conditions. I have known it rougher on the Serpentine in Hyde Park.'

"REAL EXPLANATION.

"The fact that for consumptives rough weather is dangerous would deter doctors from sending them to Madeira were the bay as bad as it is painted, but they are sent in shoals.

"'There is a scientific reason for the Bay of Biscay being frequently rough, but only in certain states of wind—*i.e.*, when westerly and south-westerly winds prevail, and sweep along the north coast of Spain from the Atlantic, and then turn sharp up the west coast of France. But the Bay of Biscay is only just one other case of seas wrongly named.

People speak of the Blue Mediterranean, with its sunlit shores and warm, caressing winds.'

"'The Blue Mediterranean, indeed!' said a University man yesterday. 'My experience of the Blue Mediterranean was gained in a thirty hours' trip from Alexandria to Athens, which I spent on my back in the cabin, not daring to get up lest the horrors of death should fasten upon me. This was in April, when all should have been smiles and warmth. But we had a wind like the biting "mistral" that sweeps along the Riviera coast in spring-time, and is more bitter than a winter storm on any Yorkshire moor.'"

That the two Tides in 24 hours are due to the water being heaped up on the side of the Earth nearest the Moon, while the Earth is partly pulled away from the water on the opposite side, which water is consequently left heaped up also.

The old explanation is right as far as the heaping up of the water on the side of the Earth nearer the Moon by the attraction of the Moon (and the Sun when he is in conjunction with the Moon) is concerned, but the old explanation is wrong in saying the Earth is pulled away from the water on the opposite side, thus leaving the water behind. If this continual pulling away of the Earth occurred, it would gradually get nearer and nearer to the Moon. Again, the Moon being so much the smaller, why should it pull the Earth away so much? If such a pulling away occurred it would be the Moon which would have to approach the Earth to a greater extent than the Earth moved towards the Moon. The old explanation fails because it tries to account for the heaping up of the water on the two sides without the necessity of any rotation. If the Earth and Moon could remain perfectly stationary, there would be only *one* heap of water, viz., that on the side nearer the Moon. But the Earth and Moon are *not* stationary, nor does the Moon rotate round the Earth as if the centre of the Earth were a fixed point in space. Instead of this, these two bodies, so to speak, waltz round a common centre of rotation, which is neither the centre of the Earth nor still less the centre of the Moon, but is a point between the centre of the Earth and the centre of the Moon on a line joining these centres. To find its position we proceed thus:—

Let M be the mass of the Earth.

„ m „ „ „ Moon.

Let R be the distance of the mass centre of the Moon from O the common centre of rotation.

,, r be the distance of the mass centre of the Earth from O.

Then R + r is the distance between the mass centre of the Earth and the mass centre of the Moon.

For dynamic equilibrium the centrifugal force due to one of the bodies must be equal to the centrifugal force due to the other, *i.e.* :—

$$M\omega^2 r = m\omega^2 R \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (1).$$

where ω is the angular velocity of the bodies about O.

Cancelling, equation (1) becomes,

$$Mr = mR \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (2).$$

$$\therefore \quad \frac{M}{m} = \frac{R}{r} \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (3).$$

The mass of the Earth is equal to 81 times that of the Moon, and the distance between their mass centres is 239,000 miles, thus :—

$$\frac{M}{m} = \frac{81}{1} \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (4).$$

Hence, combining (3) and (4) :—

$$R = 81r \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (5).$$

and as $R + r = 239{,}000$ miles $\quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (6).$

$\therefore 82\,r = 239{,}000$ miles

$r = 2{,}910$ miles

and $R = 236{,}090$ miles.

As the radius of the Earth is 4,000 miles we see that O, the common centre of rotation, is 1,090 miles below the surface of the Earth and towards its centre. Consequently the water on the side of the Earth remote from the Moon is farther from O than any other water and the centrifugal force acting on this water is the greatest and consequently it is ' thrown out ' and heaped up.

As a homely illustration, suppose a man wearing a tail-coat takes a child into his arms and swings him round and round. They will revolve round a common centre of rotation, and the man's coat tails will fly out at his back in representation of the tide on that side.

It is remarkable that at least two distinguished people fell into this error, for in *The Connection of the Physical Forces* (1877), by Mary Somerville, p. 107, we read, " . . . so the Earth has a tendency to leave the waters, but is

retained by gravitation, which is again diminished by this tendency. Thus the waters immediately under the Moon are drawn up from the Earth, at the same time that the Earth is drawn from those waters which are diametrically opposite to her." While at p. 149, *Advanced Text-book of Physical Geography* (1883), by Prof. David Page, LL.D., F.G.S., we read, " . . . . . while on the opposite side t' the Earth is drawn, as it were, away from them [the waters], and they stand out nearly at the same height as those at t."

That Springtides occur only in the Spring

They occur twice in each month throughout the year (!) about the new and full moons, and are somewhat greater near the equinoxes, *i.e.*, about the ends of March and Sept. They are due to the combined action of the Sun and Moon, these two bodies being in a straight line with the Earth at those times. In mid-Atlantic, the tide due to the Moon alone is about 2 feet, and that due to the Sun alone is 1 ft., so that their joint action produces (in mid-ocean) a tide of 3 feet.

That the Volcanoes of Old were all similar to the Existing Ones, such as Vesuvius and Etna

" On the contrary, in Iceland where the most copious lava-floods of historic times have been discharged, the regular Vesuvian cone, built by successive sheets of lava and ashes, is comparatively infrequent and unimportant among the manifestations of subterranean energy. It appears that the Icelandic eruptions are essentially due to the opening of fissures in the ground, and to the overflow of lava from these over the surrounding country. [These observations were made by Prof. Thoroddsen, a geologist who resided in Iceland, and are quoted by Sir Arch. Geikie, F.R.S.—Ed.] Thoroddsen estimates that the mass of lava there displayed, if poured over Denmark, would have covered that country to a depth of 16 feet."—Sir Arch. Geikie, *Ency. Brit.*, Vol. XXVIII., p. 640.

That the Earth is considerably Flattened at the North and South Poles

This is a matter of definition, but most people think that the flattening could easily be seen with the naked eye if we could view the earth from a considerable distance. The shape is indeed often likened to that of a tangerine orange. To add to the popular belief, we have the fact that the attraction,

due to gravity, is undoubtedly greater at the poles than at the equator, but for all this the fact remains that the ratio of the equatorial diameter to the polar diameter is 301 to 300, and if we were stationed on the moon it would need instruments of great precision to detect so small a difference. Prof. J. H. Poynting, D.Sc., F.R.S., in his little book *The Earth* (p. 32), gives the ratio as 293 to 292, which equal to 1·003, the same as the ratio 301 to 300.

On measuring a couple of very ordinary looking oranges, which seem to the eye to be nearly spherical, we find the following results :—

No. 1	Equatorial diameter	65 mm.	Ratio 1·12
	Polar diameter	58 mm.	
No. 2	Equatorial diameter	60 mm.	Ratio 1·11
	Polar diameter	54 mm.	

clearly showing that the earth is *far* more nearly spherical than an ordinary orange.

That there was only One City of Babylon

Under "Cairo" in the *Harms. Ency.*, Vol. II., p. 416, we learn than when Amr-ibn-el-As conquered Egypt, in A.D. 640, he built a town "upon the site of the Roman Babylon (Masr-el-Atîka), and called it El-Fostât." This town gradually spread north and north-east, until it extended to the Citadel (of Cairo), when Ahmed-ibn-Tulun erected a new town called El-Katâ'i. The City of Babylon of the Bible was not on the site of Cairo. Its history begins about 3800 B.C., while that of Rome begins only about 750 B.C. "Babylon (the Roman one) is said by Strabo to have been founded by emigrants from the ancient city of the same name in 525 B.C., *i.e.*, at the time of the Persian conquest of Egypt. Here the Romans built a fortress. . . . The town of Babylon disappeared, but the strong walls of the fortress in part remain, and the name survived, 'Babylon of Egypt,' or 'Babylon' simply, being frequently used in medieval writings as synonymous with Cairo."—*Ency. Brit.*, 11th ed., IV., p. 956.

"The letter comes from Babylon, which could scarcely be old Babylon by the Euphrates, where the Jewish colony at this time was in a depressed state, nor the Babylon in Egypt, near Cairo, claimed for it by the Copts, ... More probably Babylon is a cryptic name for Rome here, as in the Apocalypse."—Drs. Bennett & Adeney, p. 71, *The Bible and Criticism.*

That the Goodwin Sands are Quick-sands

Sir Alfred Yarrow, Bart., F.R.S., M.I.C.E., the well known steam launch and torpedo boat builder, wrote on Mar. 4, saying, " I do not think the Goodwin Sands are any different from any other sands, at least any other sand found in many places. Some sands are indeed more solid than these. I have spent a lot of time on the Goodwin Sands, because some years ago we found the depth of water, where we were running our boats for trials, was not sufficient to ensure good results; we therefore asked the Admiralty to put up a measured mile on the Goodwin Sands, and we were told it was quick-sand, and that everybody would soon disappear. We went out there and put up two posts, but we never disappeared! I do not see any difference in sinking in these sands any more than one finds at many seaside places. We did put up the posts, but the storm of one winter sent them down. I enclose you a little photograph of the process, and you will see the water was actually over the sand at the place and at the time we were working, and certainly if there had been anything extraordinary about the sands we should have realised it very quickly. It was an interesting adventure. I remember one evening returning from the expedition on the sands and going to dine at an hotel at Deal; a report had been spread that some shipwrecked people were coming from the sands, and we were all looked upon as curiosities."

The photo to which Sir Alfred refers shows 7 men operating a ' monkey ' for driving in the posts, besides 3 other men. All are ankle deep in the water. *Harms. Ency.* refers to the Goodwins as " sufficiently firm for walking on " at low water.

That Mont Blanc is in Switzerland

It isn't; it's in France! It would be a far better case to argue that it is in Italy than in Switzerland, for on referring to *The Citizen's Atlas* map, No. 51, of France, we find the mountain well away from Switzerland, but apparently just in Italy, and on referring to map No. 70 of Italy, we again find it shown by the colouring to be just in Italy! This must be due to a slight want of ' register ' when the maps were printed, for on referring to the index, Mont Blanc is given as in France, and on looking it up in the attached *Gazetteer of the World* we find, " Blanc, Mont, France, Alps, highest in Europe. Alt. 15,781 ft." It is wholly within the frontier province of

Haute Savoie (France). *Harms. Ency.*, Vol. II., p. 128, says, "By the treaty ceding Savoy to France, in 1861, it was agreed that the highest summit should become totally French. . . . It was first ascended in 1786 by two Chamonix men—Dr. Paccard and Jacques Balmat. . . . In 1787 the first Englishman, Col. Beaufoy, achieved the ascent. . . . The first winter ascent was made by Miss Isabella Straton in Jan., 1876."

That the Trade Winds are due to cold air flowing from the Poles to the Equator, and that their apparent directions are due to their motion towards the Equator combined with the Peripheral Speed of the surface of the Earth.

"Such, for instance, are the theories which quite a short time ago laid down the circulation of the atmosphere between poles and equator upon the earth, with ascending and descending currents, to explain the trade winds. These have all gone by the board since we have begun to lean some facts about the actual state of the upper atmosphere."—R. A. Sampson, D.Sc., F.R.S., p. 9, *The Sun.*

That Lake Windermere is wholly in the County of Westmoreland

According to the gazetteer at the end of the *Citizen Atlas*, the lake is in Westmoreland and Lancashire, and on referring to map No. 23 it will at once be seen that about one-third (viz., the southern portion) of the lake is in Lancashire, while even the Northern portion has its western shore in Lancashire.

That there are no Rivers of any importance in Australia

Mr. W. Herbert Garrison, F.R.G.S., lecturing at the Royal Colonial Institute on Jan. 5, 1916, pointed out how easily children had been misled in important geographical facts by some of the matter in school books on geography. Among many other ridiculous things in one book he had was the statement that there were no rivers of any importance in Australia, and that those which were of any consequence never reached the sea. He reminded his audience that the Murray River was 3,000 miles long. By this he must have meant the total length of the river plus its tributaries, as, taking the Murray River and its tributary the Darling as one river, which we may fairly do, the combined length is only

1,600 miles. A glance at a good map of Australia will show that there are several rivers, each 300 or 400 miles long and discharging into the sea, besides others which discharge into lakes.

That the Birds in Australia do not sing, and that the Flowers do not Smell

This is probably merely a matter of degree or definition as to what is meant by 'sing' and 'smell.' Discussing the subject with a couple of well-informed Australians, they said the following birds "have notes even if you will not call them songs :—

"The stock-whip, kingfisher, skylark (not the same as the British bird of that name), magpie and the butcher bird.

"And that the following flowers smell :—

"Eucalyptus flowers, myall tree flowers, wattle (=mimosa); boronia, jessamine, Queensland lily, and, in some places, the wood violet." They confined their remarks to places in the S.W. of Australia and 500 miles from the coast. Near the coast the popular opinion seems to be fairly well justified.

"It is remarkable that only small birds properly sing. The Australian genus Menura, however, must be excepted; for the *Menura Alberti*, which is about the size of a half-grown turkey, not only mocks other birds, but 'its own whistle is exceedingly beautiful and varied.' The males congregate and form *coroborying* places, where they sing, raising and spreading their tails like peacocks and drooping their wings.

"[Gould, *Handbook to the Birds of Australia*, Vol. i., 1865, pp. 308-10. See also Mr. T. W. Wood in the *Student*, April, 1870, p. 125.]."

—Charles Darwin, pp. 567-8, *The Descent of Man*.

The late Hon. J. G. Jenkins, formerly Premier of New South Wales, said, at the Casual Club, on Jan. 10, 1918, that Australian flowers do smell, and the birds there do sing. Col. A. B. Cottell, R.A.M.C., Hon. Treas. of the Club, confirmed this at the time. The late Capt. H. G. V. Adler, A.M.I.C.E., also told me it is a fallacy, he knowing Australia well.

The following might contain further information : *The Birds of Australia* (1917), by Gregory M. Matthews. A series of papers published in 1883 on Australian birds, by Col. William Vincent Legge.

That New York is the Capital of the United States of America.

Washington is the capital.

"THE CAPITAL OF THE U.S.A.—New York was never the capital of the United States; it is not even the capital of the State of New York, the seat of whose government is located at Albany.

"The centre of Revolutionary activity from 1763 to 1774 was Philadelphia, then the capital of Pennsylvania, where the first Continental Congress was held in the latter year, and where the celebrated Declaration of American Independence was drafted and issued to the world. Except during the period of 1776-7, when the city was occupied by English troops, Philadelphia remained the capital of the newly formed Union down to the year 1800. Previous to this date Congress decided to found Washington as the new capital, in the District of Columbia, a tract of land taken from the two States of Virginia and Maryland, so as to prevent the engendering of any jealousy between the different members of the Union. The present capital of Pennsylvania is Harrisburg, an otherwise unimportant town, some 100 miles west of Philadelphia on the River Susquehanna.

"N. W. HILL."

—*Notes and Queries*, June, 1917, p. 338.

That the Spanish Main necessarily means a particular High Sea

In the old song *Drake goes West* we find, "Drake goes West to sweep the Spanish Main. . . and some will sleep their long sleep beneath the Spanish Main." Here, undoubtedly, the watery element is meant, and according to the *Con. Ox. Dict.* in poetry the "high sea" is meant by Spanish Main, but why should *Spanish* Main mean apparently *any* high sea? In *Notes and Queries*, Mar., 1919, p. 65, St. Swithin and the Editor gave the following information:—The following remarks are taken from *Some Recollections*, of Admiral Sir Cyprian Bridge:—"The Spanish Main is often referred to in books as if it were part of the sea; whereas it is simply the sailors' translation of *tierra firme*, and means the Spanish mainland in Mexico and in Central and South America as distinguished from the Spanish islands in the West Indies." The *New Eng. Dict.* under "Spanish," 1, b, has:—"*Spanish Main*, the mainland of America adjacent to the

Caribbean Sea, esp. that portion of the coast stretching from the Isthmus of Panama of the mouth of the Orinoco ; in later use also, the sea contiguous to this, or the route traversed by the Spanish register ships." Longfellow's *Wreck of the Hesperus* (1839) is quoted in illustration of the later use.

That the Niagara Falls are the Largest in the World.

Niagara Falls are in two portions, the American Fall being 167 ft. high and 1,060 ft. wide, and the Canadian or Horseshoe Fall, 158 ft. high and 3,010 ft. wide, while the quantity of water is 18,000,000 cubic ft. per minute. The Kaieteur Falls, Potaro River, British Guiana, are 741 ft. high or nearly five times the height of Niagara Falls, and 370 ft. wide. Particulars of these falls will be found at p. 29 of the *British Guiana Handbook*, 1913, edited by Alleyne Leechman. The Victoria Falls on the Zambesi River are 5,580 ft. (over a mile) wide and 400 ft. high.

That Gordon Castle, the Scottish Seat of the Duke of Richmond, is in Banffshire

This is akin to Kensington Palace being in Westminster (though scarcely anyone realised it, in fact, it is doubtful whether the Palace itself knew it !) About 20 years ago it used to be in Westminster, but it is now in Kensington. It was not moved (as, most unfortunately, lovely old Crosby Hall was), but the boundaries of Kensington and Westminster were so adjusted as to make the change. Similarly, Gordon Castle used to be in Banffshire, but about 1882 a portion of Banffshire containing the castle was added to Elginshire.

" It is a strangely persistent mistake that Gordon Castle, the Duke of Richmond's Scottish seat, at which he is just now staying, is in Banffshire. It is very nearly a quarter of a century since the north-west corner of Banffshire, including Gordon Castle and the neighbouring village of Fochabers, was annexed to Elginshire. And yet ' Gordon Castle, Banffshire,' still appears, not only in the newspapers but in most books of reference.

" Since that change the Duke of Richmond's United Kingdom title has been rather ' in the air.' That title is not Duke of Gordon, in the county of Berwick, but ' Duke of Gordon, of Gordon Castle, in the county of Banff.' Such it was created in 1876 ; but since 1891 Gordon and Gordon Castle have been

equally extraneous to the county of Banff."—*Pall Mall Gazette*, Mar. 2, 1915.

That Iceland Abounds in Ice.

Mr. C. E. Clark, p. 29, *Mistakes We Make*, says, "The fifty and occasionally sixty degrees below zero registered in some parts of farm-land Canada—Assiniboia, for instance—and even thirty-five and forty below, experienced in many places in the United States, are unheard of in Iceland. There are glaciers in the island, of course; but they form no icebergs, and the sea around the island is never frozen." *Ency. Brit.* says:—

"The centre of the island is a table-land, or rather a broad flattened ridge, consisting of arid sands and rugged tracts of lava. . . .

". . . The lower parts of the [southern] hills then begin to be clothed with grass, affording pasture for sheep, cattle, and horses. .

"Between the extremity of the latter and the central highlands there is a large and fertile district consisting of grassy valleys, divided by low hills, and an extensive plain covered with marshy grassland. This district is a fair specimen of many of the inhabited parts of Iceland. The level lands, the valley bottoms along the river banks, and in many cases the slopes of the hills are covered with grass, but the soil is too frequently boggy and marshy. The hills are partly covered with heather, and in a few places with stunted dwarf birch. . . .

"The climate of Iceland is not nearly so severe as might be supposed from its latitude. At Reykjavík the mean temperature of the year is 39° F., of the summer 53° F., and of the winter 29° F. . . One feature in the climate has been noticed by all travellers, that is the clearness and purity of the atmosphere, rivalling that of Italy, mountains being seen distinctly at a distance of 100 miles."

That all Staffordshire forms part of the "Black Country"

We hold no brief for the "black country"; it cannot well be painted too black to represent the facts of the case. Though an engineer, the author freely admits that engineers only too often spoil the face of nature. Dudley Port should be re-named Deadly Port, but there still remain beauty spots in the neighbourhood of the black country. Dove Dale and the valley of the river Churnet, and the N.E. of Staffordshire

in general are some of the most beautiful parts of England. Even the district in the south, between Wolverhampton and Tattenhall, is by no means like what is brought to mind by the term " black country."

That the Comparative Mildness of the Climate of the British Isles is due to the Gulf Stream

There is no doubt that this was the " official " or orthodox opinion until more or less recent times. Dr. M. F. Maury (p. 93, *Physical Geography*, 1864) gives the popular version, and is almost poetic in writing about it. Brewer agrees with him. The *Cent. Dict.* wavers, with a tendency towards going against the popular and (in *this* case) very excusable belief, as the following extract shows :—

" The Gulf Stream exerts a most important influence in moderating the climate of France, the British Islands, and other parts of Western Europe. The distance to which the Gulf Stream is felt in a north-easterly direction has been the subject of much discussion among thalassographers. It seems pretty clearly established, however, that a considerable portion of the effect produced on the climate of Northern Europe, which was formerly ascribed exclusively to the Gulf Stream, is in reality due to a current coming from the Antilles (the Antilles Stream), which joins the Gulf Stream to the north of the Bahamas."

Harms. Ency. says, ". . . It is to this current [' general movement east of the surface waters of the Atlantic '], or rather drift, of warm superficial water that the comparative mildness of the winters in Norway and north-west Europe is in the main due. The Gulf Stream properly so-called has little to do with this phenomenon."

One of our most prominent geographers, Sir Halford J. Mackinder, in his *Britain and the British Seas*, says, " This warmth [of the British winter] is not due to the Gulf Stream, as is commonly stated. That very definite current ceases to be distinguishable a little to the east of the Newfoundland Bank, fully 1,500 miles from the nearest shore of Britain. The warm water west of Britain is due merely to the general north-eastward drift of the ocean surface, propelled by winds from latitudes in which sunshine is powerful." In reviewing a certain recent geography book, the reviewer said, " There is much inaccuracy. The Gulf Stream myth, for instance, is there in its primæval nudity."

"The *Daily Telegraph* says quite correctly this morning that we owe our immunity from extremes of heat and cold, drought and flood, to 'the kindly influence of the sea, and in particular of the Gulf Stream.' Yet it should be added that the popular conception of the Gulf Stream is largely wrong and misleading. Modern investigations have shown that the Gulf Stream does not come anywhere near the British Islands. It ends in the vast eddy known as the Sargasso Sea. It affects our shores simply because its pressure sets up a new and entirely separate drift of warm sub-tropical water on the West Coast of Africa, which flows northward and helps to produce our temperate climate. The Gulf Stream is, therefore, only a very indirect agent in making our island home liveable. These conclusions, only reached within the last decade, are well known to marine biologists, but do not yet appear to be common knowledge. We make the disclosure with some reluctance, for in belittling the Gulf Stream we feel almost as guilty as the young American lady who spoke 'disrespectfully' of the Equator."—*Pall Mall Gazette*, Aug. 29, 1912.

Ency. Brit., Vol. I., p. 677, "If we push our researches a step farther, and inquire into what is the cause of the great warmth of the Northern Sea, we should be forced to admit that a very satisfactory answer cannot be given. Something may be due to the influence of the Gulf Stream, a minute branch of which is supposed to carry the waters of the torrid zone to the shores of Shetland and Norway; but such an agent seems too trifling to account for the phenomenon."

Vol. III., p. 20, "By the gradual thinning out of the Gulf Stream after passing the Banks of Newfoundland, by the progressive reduction of its rate of movement, and by the loss of that excess of temperature which previously distinguished it, as well as of its peculiar blue colour, this remarkable current so far loses all its special attributes, as to be no longer recognisable to the east of the meridian of 30° W. long."

That the Climate of the British Isles is Milder now than it was, say, 100 or 200 years ago

Sir Richard Gregory, D.Sc., read a paper early in 1915 before the Circle of Scientific, Technical and Commercial Journalists. This was briefly reported at p. 137 of *Knowledge* for May, 1915. Sir Richard stated that when meteoro-

logical records are examined they show that the temperature, rain, snow, frost, and so on, are much the same at the present time as they were in the early days of the declining generation.

" Tradition, and general impressions of elderly people, are, indeed, of little value in deciding whether any permanent change of climate has taken place. The only trustworthy test is provided by records of rainfall, temperature, or other meteorological observations made systematically with suitable instruments. . . . "

" From an examination of old records, and of the long series of observations made at Greenwich, Sir John Moore was able to show to the British Assoc., in 1908, that no appreciable change has taken place in the climate of the British Isles during the past six centuries."

That the " Australian Bush " consists of Low Bushes or Shrubs

In answer to the author's query in *Notes and Queries*, there were several replies of which the following are abstracts :—

" Four-fifths of the population of Australia are inhabitants of the coastal cities, and these speak of the whole interior of the Continent as ' the bush.' The dwellers in the agricultural districts immediately behind the coast speak of the district further inland as ' the back country.' As the bush is a general term for the whole interior of the country, it is manifest that its vegetation has many aspects which cannot be enumerated in a brief reply . . . covered with grass, dotted with trees nearly all belonging to the same family, and presenting a uniform dark green hue to the eye, extending for hundreds of miles. The trees are not so close together as to prevent the grass from flourishing on the plain beneath, and there is little or no undergrowth."—F. A. Russell, May 29, 1920, p. 256.

" The term ' Australian Bush ' is intended to apply to those sections of the country which are remote from the large town, and applies equally to timbered country, untimbered country, and country covered by stunted vegetation called ' scrub.'

" There is no actual ' bush ' resembling, for instance, the Indian jungle. . . ."—J. Murray Allinson, June 5, 1920, p. 278.

Other replies were to the same effect.

That the height of a Mountain cannot be determined without Climbing it

A writer of an article in the *Daily Mail*, June 10, 1920, gave expression to this fallacy. One wonders how it is suggested the height would be determined by climbing the mountain—by dropping a tape measure from the top to bottom! There are other methods applicable to climbing, but the method known to students of trigonometry as "heights and distances" is the most accurate and does not involve the detail of climbing. Mount Everest has not yet been completely climbed, yet for about 50 years its height has been given with an implied accuracy far exceeding that of most mountains, for practically all books, including *Ency. Brit.*, give its height as 29,002 feet. For many years this puzzled the author until he was told that this height was first determined by a Frenchman, who naturally gave his result in metres, viz., 8,840, and he did not attempt to give the last digit accurately. This number of metres on being converted gives 29,002 feet, and the computer, lacking vision, failed to convert the 2 into a 0!

That there is a Direct Mingling of the Waters of the Pacific and Atlantic Oceans at the Panama Canal

There are several locks on the canal to save deeper cuttings. The oceans are practically at the same level, and the locks are fed by *fresh* water from a high level, so that when the lower locks are opened the fresh water flows into the ocean near it.

That The Peak, Derbyshire, is a Mountain

"It is incredible that the name of the Peak in Derbyshire can have any connection with either the English word peak (*pic*) or the Picts (*Pihtas*). The Peak is not a mountain, but a wide district covering the whole of north Derbyshire. It is referred to as a forest. The earliest form of the name is *Pec*, with the *e* short—this assertion is confirmed by the spelling of the 'Valor Ecclesiasticus, of the time of Henry VIII., *In Alto Pecco*. In that very early document, the Tribal Hidage, the inhabitants are called the *Pecsœtan*. Their territory contained 1,200 hides. In the oldest MS. of the English Chronicle, at 924, we are told that Bakewell is in 'Peaclond.' The name *Pec*, in all probability, was given by

an earlier race than the English. There is reason to think that the original British inhabitants were not exterminated; but that here, as in Elmete over the Northumberland boundary line, they long maintained their identity. The Tribal Hidage has both the *Pecsætan* and the *Elmedsætan*. A fascinating inquiry for a properly-equipped local antiquary would be the extent to which Celtic elements enter into the surviving place-names. But in matters of etymology mere speculation is worse than futile; the obvious explanation is hardly ever the real one.—A. Potts, Chester."—*Notes and Queries*, Jan. 20, 1923, p. 55.

That Turkey Rhubarb came originally from Turkey

It came from China according to the label by some which was growing in the Chelsea Physic Garden on July 31, 1920.

That Carlisle is in Scotland

It is in Cumberland, England. The error is probably due to the fact that Carlyle was a Scotsman, and hence there is a tendency to think that Carlisle must be in Scotland, especially as it is close to that country.

LAW

That a Woman may Marry her Deceased Husband's Brother

No. 117 of *One Thousand Legal Facts* states :—" You cannot marry your deceased husband's brother," and at p. 443 of *Every Man's Own Lawyer*, we find, " If a widow, therefore, goes through a marriage ceremony with a brother of her deceased husband, the ceremony is a mere form, and will not result in legal marriage between the parties in this country . . . "

That if a Woman's Husband leave her, and she neither Sees him nor Hears of him for Seven Years, she is at Liberty to Contract a Legal Marriage again

No. 279 of *One Thousand Legal Facts* states :—"Where a husband or wife has been absent for seven years and not been heard of, and is still living, though *the second marriage of the other party is void*, yet there can be no prosecution for bigamy in such a case."

A case in the Court of Criminal Appeal was reported in *The Daily Telegraph*, July 27, 1921, in which the conviction for bigamy was quashed because, the Lord Chief Justice said, " The onus on the prosecution to prove knowledge on the part of the prisoner that [during seven years preceding the second 'marriage'] his wife was alive had not been discharged."

William Wills, p. 34, *The Law of Evidence*, confirms this.

That First Cousins may Marry, but Second Cousins may not

" If there is any foundation for this statement, it consists rather in the marriage of first cousins once removed than of second cousins. It will be seen that the latter relationship belongs to the same generation ; but it is not so with the former, which partakes more of the nature of uncle and aunt with nephew and niece."—*Notes and Queries*, No. 213.

The following from Burn's *Ecclesiastical Law*, edited by Lord Phillimore, Vol. II., p. 449, explains the matter :—

" By the civil law first cousins are allowed to marry, but by the canon law both first and second cousins (in order to make dispensations more frequent and necessary) are

prohibited; therefore, when it is vulgarly said that first cousins may marry, but second cousins cannot, probably this arose by confounding these two laws; for first cousins may marry by the civil law, and second cousins cannot by the canon law."

"The difference of the computation (of consanguinity) by the civil and canon laws may be expressed shortly thus: the civilians take the degrees in both lines to the common ancestor; the canonists take only the number of degrees in the longest line. Hence, when the canon law prohibits all marriages between persons related to each other within the seventh degree, this would restrain all marriages within the fourteenth degree of the civil law. All marriages are prohibited between persons who are related to each other within the third degree, according to the computation of the civil law. This affords a solution to the vulgar paradox, that first cousins may marry and second cousins cannot. For first cousins and all cousins may marry by the civil law, and neither first nor second cousins can marry by the canon law. But all the prohibitions of the canon law might have been dispensed with. It is said that the canon-law computation has been adopted by the law of England; yet I do not know a single instance in which we have occasion to refer to it."—*Christian's Notes to Blackstone's Commentaries*, b. ii. c. 14.

Legal Fallacies

Mr. John Timbs, F.S.A., gives the following:—"It might be expected that the 'uncertainty' of the Law would lead to many errors and absurdities as to its provisions; and from a host of such baits for credulity we select these:—

1. That if a criminal has hung an hour and revives, he cannot afterwards be executed.
2. That it is necessary in some legal process against the sovereign to go through the fiction of arrest; which is done by placing a ribbon across the road, as if to impede the royal carriage.
3. That Deeds executed on a Sunday are void.
4. That Leases are made for the term of 999 years, because a lease of 1,000 years would create a freehold.
5. That in order to disinherit an heir-at-law, it is necessary to give him a shilling by the will; for that otherwise he would be entitled to the whole property.

6. That a surgeon or butcher * (from the barbarity of their business) are ineligible as jurors.
7. That pounds of butter may be any number of ounces.
8. That bull-beef should not be sold unless the bull has been baited previously to being killed.
9. That first cousins may marry, but second cousins cannot."

The following article from *Pearson's Weekly*, of Aug. 8, 1896, deals with a number of legal fallacies. We are obliged for permission to re-print it in full :—

"The misconceptions of the public upon everyday questions of law are widespread and serious, leading as they frequently do to unfortunate consequences.

"One of the commonest of these fallacies—indeed, it is remarkable how many intelligent persons, especially tradesmen, share it—is that if there be two accounts, say, owing from one person to another who accepts and gives a receipt for the later one, that such receipt virtually operates as a discharge of the earlier item, which cannot afterwards be recovered. It scarcely seems necessary to tell intelligent people that there is not one grain of truth in this belief, the only question being whether the item itself has been paid or not. Indeed, a receipt for the item itself would not be conclusive, a receipt not being, as is often imagined, final, but only evidence of payment, which could be contradicted by any other evidence showing that in reality the money had not been paid.

"Possibly a still more prevalent error is that relating to damage done by dogs. 'One bite free' is a very common saying which is generally believed to express the law upon this subject. There is some slight ground for this belief, which has, indeed, arisen from a confusion of the evidence which has been given on particular occasions with the principle which governs the question. When an action is brought against the owner of a dog for injury which it has done to another person, the whole gist of such action, like that of almost every other action for damage done, is negligence upon the part of the defendant.

"If the evidence shows that he has been negligent, then he is liable for damages, otherwise he is not.

"As it is a common and universal practice for men to keep dogs, and to allow them to wander at large, it could

* See "Butchers not Jurymen," in *Things not Generally Known*, p. 175.

not reasonably be said that a man was negligent simply because he allowed his dog to be in a position to bite anyone. But all would agree that if a dog were known by its master to be ferocious or likely to bite human beings, then he would be negligent in allowing it unrestrained liberty. In such an action, therefore, it is merely necessary to prove that the master himself was negligent, and the most natural way of proving this is by showing that the dog had bitten or attempted to bite someone before.

" But the negligence might just as well be proved, and often is proved, in another way, by showing, for instance, from other facts that the master had good reason for knowing that his dog was fierce, although it had never previously attempted to bite anyone, in which case, of course, there would be liability for the first bite, and it would be incorrect to say ' One bite free.'

" ' Trespassers will be prosecuted ' is a well-known terror-striking phrase to the community ; but there is nothing in it, according to the strict sense of the words as they are generally understood, conveying as they do the idea of durance vile and fines. No man can be ' prosecuted ' for simply trespassing upon the land of another, if we take the word ' prosecuted ' in its ordinary and proper acceptation, as implying criminal prosecution. All that the owner can do is to sue the trespasser in a civil court for the damage he has done to the land, and, as this would be trifling, the damages awarded would be merely nominal, unless there were aggravating circumstances.

" If the court thought that the action was oppressively brought against an unintentional trespasser, it might well order the owner himself to pay the costs, which are always in its direction. Of course, the trespass might be accompanied by wilful damage, or other criminal action, for which th terespasser might strictly be ' prosecuted,' although, of course, in such case he would not be prosecuted as a mere trespasser. There is, then, not much terror in such notice.*

" How often do we hear the expression, ' The greater the truth, the greater the libel.' As generally understood, this is directly opposed to the truth. The fact is that in a *civil* action for damages for libel, the truth of the assertion is an absolute defence, and it should be ' where there is truth there

* The late Mr. Justice Wright put up boards stating, " Trespassers will not be prosecuted ! "

is no libel.' Indeed, truth and libel cannot, in such case, go together. It is somewhat different, however, in the case of a *criminal* prosecution for a libel, one of those survivals of the dark ages, which is still allowed to exist.

" The publication of damaging statements, whether true or false, has been considered by our legal sages as likely to lead to breaches of the peace, and, therefore, to be a fit subject for punishment ; and that the more truth there is in such statements, the more likelihood is there of mischief resulting. But even in a criminal proceeding the truth of the statement may be inquired into, and the court in pronouncing sentence may consider whether the guilt is mitigated by the evidence of its truth. The current maxim therefore has not much reason to support it.

" It seems to be a common impression among householders and other tenants that a notice to quit, in order to be valid, must be given before twelve o'clock at noon, and the insufficiency of a notice given later has often been set up in the courts. But the law knows nothing of such limit, and an act done, or an event happening at any time of the day is, as a rule, as valid as it would have been at any other time of the day.

" Thus, also, it is a common impression that a man comes of age on his twenty-first birthday. The fact is that he comes of age at the very first moment of the previous day. As the law does not concern itself about trifles it does not consider portions of days, and having thus entered upon the last day which it is required to complete twenty-one years of life, he is considered to have lived those twenty-one years.

" Another misconception very common amongst tenants is that a tenancy agreement can be properly stamped with a sixpenny stamp, in the same way as any other agreement, and many persons take agreements for tenancy instead of leases, under the impression that they can thereby save stamp duty.

" There is, however, a special provision to the effect that a tenancy agreement shall bear the same stamp duty as a lease, so that, if stamped with an ordinary sixpenny stamp, it cannot be put in evidence. The legislature had foreseen that, as a tenancy agreement was virtually as good as a lease, tenants would be tempted to take the former in order to avoid payment of duty. They, therefore, made this provision, which should be better known among the non-professional classes.

" Another misconception with regard to stamping docu-

ments is that a will requires stamping in the same way as a deed. This idea, though common, is as erroneous as another which sometimes finds expression, even in well-known books, that a will requires ' sealing and delivering.' Of course, as most people know, it only requires signing in the presence of two witnesses.

" But one of the most widely-spread errors upon legal subjects relates to the question of ' rights of way.' It is very frequently stated that the public must, in order to obtain a right of way over any private lands, use it continuously for a period of twenty years. This is entirely a mistake, which has evidently arisen from the confusion of the subject with that of ' prescription.' The latter is the means by which a right of way or other ' easement,' as it is called, arises between private persons, and it is necessary in this case by the terms of the Prescription Act, that it should be used for twenty years previously.

" The means, however, by which the public acquire a right of way is by what is termed ' dedication,' that is, by evidence of the owner's intention to dedicate the way to the public. For this no particular time is necessary ; indeed, there may be such an avowed act of dedication that it will take place immediately. The whole question is one of intention, and the length of time during which the public have used the way is only one element to be considered. It has been thought by some that the period of twelve months is the necessary time to prove dedication, and this idea seems to have arisen in the following way :—

" When the owner of land wishes to allow the public the use of a path across it, but does not wish to dedicate it absolately, and thus lose his control over it, he shows his intention by occasionally closing it, as, of course, he is entitled to do. In many cases the owner thus closes the way once every year, although there is no more reason for such period than of any other period, and thus the impression has arisen to which we have referred. It is like the ' one bite free ' case—merely an illustration of the frequent practice of mistaking the particular application for the general rule.

" It is, again, said to be a somewhat common belief that it is necessary, if a man wishes to ' disinherit his heir,' to leave him at least one shilling by his will, which is popularly known as ' cutting the heir off with a shilling.' This entirely erroneous idea seems to have been derived from the Roman law

doctrine of ' inofficious testaments,' whereby, in certain cases, wills which purported to disinherit children and others were void.

" The word ' heir ' leads to another popular misconception. Often one person is spoken of as being another's heir during the lifetime of the latter, and men frequently say they will make a certain person their heir. This, according to the legal view, is entirely wrong. The heir is the person who succeeds to his ancestor's land on an intestacy, and any other to whom he may leave it by will is not his heir, but his devisee ; indeed, no one can make any person his heir.

" Again, the person who, if he survive the owner, will succeed as heir to his property is commonly, during the owner's lifetime, called his heir. This again is legally wrong, for any presumptive heir may die before his ancestor, and, according to the law, the heir is not ascertained until the ancestor's death, the maxim being ' No one is the heir of a living man.' "

Palmistry and Spiritualism

Those who are unfortunate enough to believe in Palmistry or Spiritualism will be interested to know how the following Act deals with the subject :—

" By the Vagrant Act of 1824, 5 Geo. IV., c. 83, s. 4, any person pretending or professing to tell fortunes, or using any subtle-craft, means, or devices, by palmistry, or otherwise, to deceive and impose on any of His Majesty's subjects, is to be deemed a rogue and vagabond. Under this Act a person may be convicted for attempting to deceive by pretending to have a supernatural faculty of obtaining from invisible agents and spirits of the dead answers, messages, and manifestations of power, viz., noises, raps, and the winding of a musical-box."—James Williams, B.C.L., *Ency. Brit.* *Vide* " Modern Credulity," *Nature*, Aug. 4, 1921, pp. 705-6 ; and " Astrology," *Nature*, Aug. 18, 1921, pp. 771-2.

That London Cab Fares are Doubled after Midnight

We have been unable to discover how this mistake has arisen, and the only reason that we can suggest—in spite of our total abstinence principles !—is that as certain objects especially lamp-posts and the moon, have a peculiar way of appearing double late at night after a good (?) dinner, some wily cabbies have seized the opportunity of impressing upon

their fares the desirability of doubling the fares also, just for uniformity. Of course if 'cabby' also has 'dined,' then the matter automatically adjusts itself!

However, be this as it may, we received the following in Sept., 1896, "I am directed by the Commissioner of Police of the Metropolis to acquaint you that a cabman has no right to make a demand for double fare after midnight."

Once, when the author was travelling up from the North by a night train, there was a canny Scot in the same compartment. Our train was due at Euston at about 11.40 p.m., but we had been losing time, and there seemed to be a probability of our not reaching Euston till after midnight. This greatly troubled the Scot, for he believed that the cab fares were doubled after that time! We tried to comfort him by saying, "Well, we are going at a good pace *now*, and may just get in before twelve," and that we thought there was no regulation to the effect that the fares could be doubled. Lastly, we suggested that if the train reached Willesden at 11.50 p.m., the safest way would be to get out *there*, for although the distance would be greater than from Euston, it would not cost so much as the latter, because of being at the single rate. This advice was not taken, and when we last saw our companion he was rushing down the platform with a bag in one hand and a bundle of rugs in the other, in the hope of engaging a cab before the last stroke of midnight.

That the Police Regulations compel a Cyclist to carry a Horn, Bell, or Whistle on his Cycle

Our authority on this matter is Mr. Arch. Sharp, B.Sc., A.M.I.C.E., of *Bicycles and Tricycles* fame, who tells us that so long as the cylist makes a noise, or otherwise warns in time those who are in danger of being run over by him, he has done his duty from that point of view, and that if noise be his choice, this may be produced by his voice—begging his pardon!—or a tin pot, or trombone, or any other bone. The bell is, perhaps, the most satisfactory, for it is convenient, pleasant, and the best understood when heard by the British Public. [Capitals because we belong to it!]

That a Shopkeeper may not refuse to supply an Article which he exposes for Sale in his Windows

The following question and answer appeared in the Legal Column on p. 178 of the *Hardware Trade Journal* of May 13, 1910:—

Question.—"I should be glad if through the medium of your valued journal you would satisfy me on a question which is often brought up in the course of conversation, and which I have never been able to find out definitely. Can a trader be made to sell an article placed in his window for sale, or has he the right to refuse to sell. Of course, it would always be a man's policy to sell whatever the circumstances were, but if he refused, and it was taken to law, would he win the verdict?"

Answer.—"If a trader puts an article in his window and marks it with a price this is an implied offer to sell to any member of the public at that price, and any member of the public accepting the offer by tendering the price completes a contract which he could enforce against the shopkeeper. If, however, the article in the window is not so marked no contract can be completed until the price is agreed, and whether the shopkeeper would be compelled to sell the particular article displayed in the window once the price had been stated and implied depends entirely upon what actually takes place between the shopkeeper and the member of the public. The simple answer, therefore, to 'Subscriber's' inquiry is that if the articles were priced and there is no notice refuting the implied offer to the public, the shopkeeper can be compelled to sell the particular article so displayed in his window. If, on the other hand, the articles are not so marked, the shopkeeper cannot be compelled to sell until a price has been fixed and a contract completed, and the facts point to an actual agreement to sell and purchase the particular article displayed in the window."

That in the Poorer Districts and Parts of Towns in England a Man may Sell his Wife, and, having sold her, is Free to Marry again.

In March, 1796, the *Times* announced the sale of a wife at Sheffield for sixpence, and about the same time stated that the price of wives had risen in Smithfield Market from 10s. 6d. to 3½ guineas!!

In 1887, also at Sheffield, a man acknowledged in the County Court that he paid 5s. for another man's wife, and, what is more, there was a written agreement to sell, worded thus, "At the Royal Oak, Sheffield, I, Abraham Boothroyd,

agree to sell my wife, Clara, to William Hall, both of Sheffield, for the sum of 5s."

Several other cases were given in an article, "The Trade in Wives," in the *Daily Mail* of Mar. 1, 1899, and the following is a paragraph which appeared in that paper for Oct. 15, 1908 :—

"Samuel Lee, aged seventy, a small-holder, was committed for trial at Dunmow yesterday on a charge of ill-treating three of his children.

"Mary Cutterick said that twenty-two years ago her husband had sold her to the defendant for £5. She had had twelve children by the defendant, who had ill-treated her and turned her out with the two youngest children."

This indicates that the price has greatly increased since 1796! A buxom Zulu princess could formerly be bought for 16 cows, but the more usual price for such a dusky wife of lower degree was 5 cows.

In the *Daily Mail* of May 31, 1913, a case was reported in which a married woman was asked why she had left her husband. She replied, "Because he sold me to this man for a sovereign." "Did you agree?" "Yes!"

That a Dead Body must not be touched until the Police arrive

In murder cases this fallacy no doubt acts beneficially, as useful clues might be spoiled or lost if the least detail of the "setting" of the crime were lost to the police. But, unfortunately, it may also act dangerously, as in the case of persons apparently dead, who, if they receive suitable and immediate attention, might be saved. An instance of this nature occurred in 1903 and was reported in the *Daily Mail* of Nov. 6 of that year. A lighterman was drowned in St. Katharine's Dock, and on one of the witnesses saying he believed the body was not to be touched until the police arrived, the coroner said that but for this the man's life might have been saved by the prompt use of artificial respiration.

A similar case occurred at Southport and was reported in the *Weekly Dispatch*, April 14, 1918, the jury stating that they regretted the man's lack of commonsense in not pulling the child immediately out of the water. Another case was reported in the *Evening Standard*, Mar. 9, 1921, Dr. Guthrie, the Coroner, saying that such a notion was entirely wrong and that the life might have been saved.

That a Girl "Comes of Age" at 18, while a Man does not do so till he is 21

On reference to a legal handbook it will be found that, according to English law, *any* person under 21 years of age is an infant in the legal sense.

Apparently an exception is made in the case of royalty, for it was announced in the morning papers of Sept. 1, 1899, that Queen Wilhelmina having become 18 years old the previous day, she was of age to reign alone. It was similarly announced on June 23, 1912, that H.R.H. the Prince of Wales, then being 18, had "attained his legal majority." Queen Victoria would thus have come of age at 18, and this fact may have given rise to the fallacy.

That if Fowls wander into a Garden or Field they may be killed by the Owner of the Property

This is not so, as you may discover by referring to a legal handbook or your solicitor. It does not mean that the owner of the property on to which the fowls stray has no remedy. He may bring an action for damages against the owner of the fowls.

That if a Fruit Tree growing on one Person's Property overhang that of another, the latter has a legal Right to the Fruit which falls on, or overhangs, his Property

If we may be allowed to say so, this is a very *fruitful* source of error! Again, we must refer our readers (who will not take our word for it) to legal reference books. The fruit, whether it has fallen or not, belongs to the owner of the tree, though it is true that, as a matter of practice, the owner of the tree usually forgoes claiming his strictly legal rights. Sometimes he picks the fruit before it has time to fall, or before it is taken by his neighbour! The customary practice has arisen, we think, in this manner. The person whose property the tree overhangs can compel the owner of the tree to remove the overhanging branches. To do so means trouble, and possibly expense; but so long as the owner of the tree allows the other man to have the fruit on his side, the latter is not likely to make a complaint, and thus both are satisfied. Besides, in the case of several adjoining orchards, each owner would have similar privileges, which would average out to the same thing as if each stuck out for his pound of—*fruit*.

" Apples hanging over a road do not belong to people walking along the road," said the magistrate at Acton, W., yesterday, in fining two youths 5s. each for stealing apples and damaging a fruit tree.—*Daily Mail*, Aug. 2, 1911.

To remove the last vestige of the fallacious idea from your mind, we may mention the following further facts in connection with this question of ownership. The owner of the tree may apply to his neighbour for the fruit, or ask permission to enter and take it, and if the neighbour refuse both requests, then the owner of the tree will be justified in entering upon his neighbour's property without permission. But he must not use force, nor may he commit any damage in so doing.

That if a Person A gives a Receipt to B " in Full Settlement," or " in Settlement of all Claims," and afterwards finds that he made a Mistake, he (A) cannot recover the Remainder of the Debt from B

A case which was heard at Wood Green County Court on July 24, 1906. In giving judgment for the plaintiff (who sued for the balance of an account after he had signed a receipt " in settlement of all claims "), Judge Edge said :—" A man who has a debt owing to him, and agrees to take one-half, is not bound by the agreement unless there is some consideration for it." It turns out that the " consideration " is a mere nominal thing, so that if a man accept £30 and an old top hat in settlement of an account for £50, then he cannot sue for any more on that account. In fact, one authority goes so far as to say that if the creditor accept in full settlement a cheque or bill or anything *except English coin or Bank of England notes* for a lesser amount than the debt, he will be unable to recover the balance.

It is also thought that when a debtor owes a sum of money and sends a cheque for a less amount " in settlement " of his creditor's claim, the creditor must return the cheque if he claim a larger sum is due to him. On this point we have the following opinion :—

" When a cheque is sent by a debtor, with an intimation that it is sent ' in settlement ' of a claim, it is a mistake to suppose (as is sometimes assumed) that the creditor must return the cheque if he maintains that a larger amount is due to him. In two cases that went to the Court of Appeal [Miller *v.* Davies, 58 L.J.R.Q.B. 293, and Day *v.* M'Lea, L.R.22, Q.B.D. 610, 612] the defendant in each case had sent to the plaintiff a cheque for

a smaller amount than was claimed, stating that it was intended to be 'in settlement.' The plaintiffs replied, respectively, that they accepted the cheques on account, and in each case it was held that the plaintiff was not precluded from suing for the balance of his claim."—*Every Man His Own Lawyer* (1909), p. 147.

The case is even stronger, for if the plaintiff refuse to accept on account a proper tender of a sum "in settlement," and then sues for the full amount, even if successful in this action, he will get *only the amount that was in dispute, i.e.*, the difference between the amount he claims and the sum tendered before the action by the defendant! His costs, too, will be allowed only on the amount in dispute.

That if a Railway Passenger fail to produce his Ticket when alighting he can be compelled to pay the Fare from the Station from which the Train originally started

This fallacy and a number of other matters of interest to railway travellers are dealt with in *The Railway Passengers' Handbook*, published by Geo. Routledge & Sons, Ltd.

That if a Return Railway Ticket be bought, the Return Half is Valueless unless it be used within the time stated on it

The above is true only in one particular case, that is the case of day or half-day excursion tickets, which, if not used for return on the day specified, are valueless if the return fare charged is less than the ordinary single fare.

If the return fare paid be double the ordinary fare (as is frequently the case with third-class return fares), then the passenger is entitled to return when he wishes, *e.g.*, in a week, month, year, or several years.

Again, even when the return fare is less than twice the single fare (but not less than once the single fare), and the return half has "expired," it is *not* valueless, for the passenger may travel with it by paying the difference between its cost (*i.e.*, half the cost of the "return") and the ordinary single fare.—*The Railway Passengers' Handbook.*

That a Cheque drawn in favour of "Tom Jones," and crossed "Not Negotiable" or "Account Payee," cannot be legally paid into the Account of "John Smith"

This case has been definitely settled by the Courts in the case of the National Bank *v.* Silk.

If " Tom Jones " endorse the cheque, *i.e.*, sign his name on the back of it, then " John Smith " can legally pay it into his (J. Smith's) banking account, provided " Tom Jones " gave him the cheque. If after " Tom Jones " endorses the cheque he put it in his desk, and " John Smith " steals it from there and pays it into his (J. Smith's) account, then this is *not* a legal transaction, and the bank would lose the money, though they could proceed against " John Smith " for it.

In other words, the crossing of a cheque with " Not negotiable " or " Account payee " does *not* render it non-transferable, as is generally thought. The only crossing that does that is to make it payable to " Tom Jones " and cross it " Account payee *only*." Then, even if " John Smith " steal it after " Tom Jones " has endorsed it, he (J. S.) can only pay it into " Tom Jones's " banking account, and nobody who knows anything of such matters would cash it for " John Smith."

That a " Week's Notice " must be given on a Saturday, and a " Month's Notice " on the last day of the preceding month.

A week's notice may be satisfied by the lapse of *any* seven consecutive days, and similarly a month's notice is considered in law to be a lunar month of *any* 28 consecutive days, provided always that nothing to the contrary has been agreed. But a publication of a notice " once in each week for three weeks before the sale " is held to contemplate three weeks reckoned from Sunday to Sunday, not merely 21 days before the sale.

That a passenger with a third-class railway ticket has a right to travel in a second-class or first-class compartment if all the third-class seats are occupied

This is a common practice, and one of which most railway companies as a question of policy take little notice, but the passenger has no legal right in the matter, for the tickets are issued conditionally on there being room in the train and in the particular class for which the tickets are issued. (Vide *The Railway Passengers' Handbook*, by G. B. Lissenden.)

That a Gamekeeper may help himself to what Game he likes

" There is a very popular fallacy that a keeper may help himself to what game he likes. By right of custom he may

have rabbits and pigeons for his own use only and not to sell for his own profit (unless by agreement). As to game in the ordinary sense, I should say he has no more right to it than a gardener to grapes or a carter to oats."—*Ten Years of Gamekeeping*, by Owen Jones, p. 284 (1909).

That you can stop a Bank of England Note being Cashed

Part of the wording on Bank of England notes is, "I promise to pay the bearer *on demand*." This promise is unconditional, and the note (assuming, of course, that it is a genuine one) must be cashed by the Bank of England even if it be known to the Bank the note has been stolen. This does not prevent the person cashing the note from being arrested on the spot, or afterwards, if, in fact, the note has been stolen. Supposing the number of a stolen note to be known to the Bank of England, they will, for a small fee, inform the owner of the note when and under what circumstances the note was cashed, and may in other ways assist to bring the thief to justice, but they are prohibited by law to refuse to cash any of their notes. In the case of a stolen note, the Court cannot order a Bank of England note which has been paid and cancelled to be delivered up to the prosecutor of the person convicted of stealing it. (*Rex* v. *Stanton*, 7 C. & P., 431.)

That all Children born at Sea belong to the Parish of Stepney

"By a fiction of law acts done at sea are represented as done on the Royal Exchange in London. But no such fiction was needed in the case of a child born at sea, because it belonged to the father's parish if legitimate, if not, to the mother's. The prevalence of the saying doubtless originated in the great number of seamen who have their residence in Stepney."—John Timbs, p. 114, *Notabilia*.

"A Stepney Myth.

"To the Editor of the *Pall Mall Gazette*.

"Sir,—I can assure the Rev. J. Bacon Phillips that the idea of a child born at sea is accounted a parishioner of Stepney is entirely incorrect. For years I have endeavoured to correct this mistake, but periodically it appears in well-managed newspapers.

"If a reference is made to Brand's *Antiquities and Superstitions* it will be found classified among amusing errors. The

'Stepney' belief arose in an interesting way. Seafarers who added to the population were naturally anxious to return thanks to Almighty God when the vessel arrived in the Thames, and they would repair to the nearest church for the purpose. In that way the churches at Stepney received the newly born, but in no way did they become parishioners. That was the practice over a century ago. Registration at the present time is in compliance with the ordinary law.

"H. PROSSER CHANTER.

"Whetstone, Middlesex, Mar. 6, 1923."

That anyone can obtain an Injunction against an Airman Flying over his land

This misconception was dealt with by His Honour Judge Parry in an article on "The Need for Air Laws" in the *Daily Mail*, May 4, 1910, who pointed out that the foundation of the idea is the Latin maxim, "Cujus est solum ejus est usque ad cœlum," which was current in the days of Coke upon Littleton. The translation is, "He who possesses land possesses also that which is above it," and this naturally leads the mere layman to possess the popular idea given in the heading of this article. Judge Parry goes on to point out that Lord Chief Justice Ellenborough, a great lawyer and a "sportsman," foresaw as long ago as 1815 that there would be legal trouble between the Latin maxim and airmanship, and he (Ellenborough) stated in Pickering *v.* Rudd (Campbell's Law Reports, Vol. IV., p. 220), "I do not think that it is trespass to interfere with the column of air superincumbent on the close. I once had occasion to rule on circuit that a man who from the outside of a field discharges a gun into it so that the shot must have struck the soil was guilty of breaking and entering it. A very learned judge who went the circuit with me at first doubted the decision, but I believe he afterwards approved of it, and that it met with the general concurrence of those to whom it was mentioned. But I am by no means prepared to say that firing a gun across a field *in vacuo*, no part of the contents touching it, amounts to a *clausum fregit*. Nay, if this board overhanging the plaintiff's garden be a trespass it would follow that an aeronaut is liable to an action of trespass *quare clausum fregit* at the suit of the occupier of every field over which the balloon passes in the course of his voyage." This means that an airman has the right to pass

along the King's highway of the air with the same right that a man may use the highways of land or sea, and Judge Parry says, "The layman's notion, which I have seen frequently stated, that anyone could obtain an injunction against an aviator flying over his cabbage patch is, I take it, wholly misconceived."

"The proverb 'as free as air' now stands discredited, and another byword has thus to be added to the list of Elia's 'Popular Fallacies.' When the International Conference met in Paris a couple of years ago to discuss the sovereignty of the air, it found itself unable to agree, for the simple reason that civilisation was still aghast in face of an elemental revolution. To say that we have yet realised the difference wrought, and to be wrought, by aviation on international relations would be idle flattery; we are only on the verge of things. But we know enough to see that the Institute of International Law is wrong in upholding the obsolete principle that dominion over the air is neither definable nor desirable. As Sir Erle Richards pointed out at Oxford on Saturday, it is not merely a matter of possibility, but of absolute necessity. What does it profit a State to provide the machinery of private property and public security if foreign marauders are to traverse it by day or night and sprinkle destruction wherever they like? We have assented to the principle of the landowner asserting his right of ownership 'up to the sky,' and the same right is vested in municipalities by the Code Napoléon, as well as by European and American law to-day. They simply work on the common-sense basis of self-preservation. To say that the air is as free as the sea is simply to adopt the speech of those who have probably never considered the bearings of the three-mile coastal limit on the one hand, or the possibilities of air-conflict on the other—conflict not merely in regard to war, but to immigration, Customs, and the rest. But we may go further and say that even the three-mile limit, which has hitherto made a belt of safety, will soon cease to be sufficient as a margin, especially in the case of islands and peninsulas. The recent advent of the waterplane and the lengthening of the radius of flight are making it more inevitable every day that we must protect ourselves still further, and extend the process of provident insurance against air invasion. There will be quite enough difficulty to enforce the laws once made, but laws we must have, and the sooner the better."—*Pall Mall Gazette*, Oct. 28, 1912.

That the Passage of a Corpse over a Private Road makes that road a public one for ever after

"To the Editor, *Country Life*, Jan 21, 1911.

"Sir—Will you kindly give me the opinion of your legal expert on the following point. I have a road down which there is, I fear, a prospect that some neighbours may shortly wish to conduct a funeral. It is to be understood that the road is now strictly private. I am credibly informed that if I give the permission for the road to be used for the passage of the funeral party, it will, according to the law of the land, make the road public ever after. Can you kindly tell me whether this is the case? If it is so, it appears a very extraordinary law, and I should like to know on what grounds it was originally passed, what the necessity can be for its maintenance and why it is not immediately repealed?—M. S."

The note by the Editor of *Country Life* on the above, and in the same issue, was as follows:—

"Our correspondent has given expression to a very prevalent popular delusion as to the passage of a funeral over a private way rendering that road public ever after. We know that the error exists in Cheshire, Cornwall, Derbyshire, Buckingham, Worcester, and in some parts of Wales, and it probably extends over the greater part of the country. At one time the high road between Rowsley and Chatsworth was commonly proclaimed to be a 'corpse road,' the local tradition being that originally the road, or a part of it, was private, but that a funeral party forcibly carried their dead along the road, thereby constituting it for all time a public highway. There is, however, no such law, there never was, and it is safe to say there never will be. So our correspondent may rest easy; the passage over his land of a funeral party *with his express permission* will not alter his rights one iota. If his way is now private, it will remain private until he dedicates it to the public use. It is easy to see the origin of the popular idea. As it is seldom that dedication can be formally proved, it has to be inferred by the Court from evidence of uninterrupted user. Now the passage of a public procession, such as a funeral, is impressed on people's memory; a man can say that he remembers using the alleged way for so many years, and when pressed to fix a date, he says, 'My father or grandfather died fifty years ago, and we took him along that way to be buried, and were not stopped or turned back.' Of course, no one likes to

interfere with a solemn and sorrowful occasion like a funeral, and it is more than probable that in many cases evidence of long user as of right has been traced back to such a fact, and so the popular error gathers strength and some sort of a basis. Our correspondent should either decline to allow the funeral party to pass over his ground or should make it clear that the passage is only by permission. A letter from one of the mourners, or even a statement of permission having been granted, should be placed by the owner among his title deeds, or otherwise put upon record, so as to prevent the assertion in years to come that the funeral party passed as of right and without interruption."

On Jan 28, 1911, the following letter appeared in the same paper :—

" Sir,—With reference to your correspondent's letter, ' Funerals and Rights of Way,' and your note thereon, perhaps I may be allowed to mention a curious variation of the idea that came under my notice some years ago. I held some land in Sussex, and a labourer on the place told me that ' many years ago ' the drive in front of the house had been made a public road by a funeral having been brought over it, but that the then owner of the property had made the road private again by driving *black pins* in the gates as soon as the procession had passed through. My informant was an unusually intelligent man of his class, and really took an interest in all old customs. I often questioned him on the subject, but could not get any variation of the statement or any further details. I have often come across the main idea, especially in Cornwall ; but the ' black pin ' addition was quite new to me, nor can I see any foundation for such a belief, though I have generally found that most of these old country tales have some slight substratum of truth.—J."

" It is also an error that permitting a funeral procession to pass over private grounds creates a public right of way. By Acts of 1823 the inhabitants of any parish, township, or place, when going to or returning from attending funerals of persons in England who have died and are to be buried there, were exempted from any toll within these limits ; and in 1824 the same regulation was extended to Scotland ; the only difference being that in the latter case the limitation of the district is described by the word *parish* alone."—*Cham. Ency.*, Vol. II., p. 558.

That the Statute of Elizabeth in 1601 was the beginning of the Poor Law

Mr. E. C. Price, of the Charity Organisation Society, in his paper read before the Casual Club on April 21, 1910, was most emphatic in stating that the Act was not the beginning, but that it consolidated all the legislation on the subject that had gone before, and other authorities agree with this statement.

The " Poor Rate " has always struck me as somewhat of a misnomer, *e.g.*, in Hampstead Garden Suburb, parish of Hendon, where this is being written, the demand note has the following information on the back of it :—

	d.	Amount in the £
Relief of Poor and other expenditure of Guardians	2·80	
Middlesex County Council contributions	5·71	
Metropolitan Police Rate	2·70	
Expenses of Local Education Authority	6·58	
Sundries (Registration, etc., etc.) ...	0·21	
	18·00	s. d. = 1 6

Now, if the whole of the 2·80d. went in the relief of the Poor it would be only 15·5 per cent. of the whole rate of 1s. 6d. in the £, but as " other expenditure of Guardians " is included in the 2·80, perhaps we may assume that the poor get half of the 2·80, *i.e.*, their portion is only 7·75 per cent. of the whole ! So why call it the " Poor Rate " ? Perhaps the meaning is, " It is a *very* poor rate for the poor " !

That you may not hit a dog, belonging to another person, with a stick

" Unlawfully and maliciously killing or wounding or maiming dogs are offences under various criminal statutes, and are punished summarily and by indictment for misdemeanour. A gamekeeper may seize a dog within the limits of a manor, but is not allowed to kill a dog there following game, even although its owner has received notice that trespassing dogs will be shot ; and a man is liable in damages if he places on his land traps scented with strong-smelling bait so as to influence the instinct of another man's dogs and draw them irresistibly to destruction."—*Cham. Ency.*, Vol. IV.,

p. 39. From this it is to be implied that another person's dog may be hit with a stick provided the dog is not killed, wounded, or maimed thereby, and provided also that you are sure the dog will not retaliate !

That Land in Great Britain can be entailed

Entailed estates are very popular with a certain class of novel writers, but the author has taken counsels' opinion (G. F. Emery, Esq., LL.M., and L. W. J. Costello, LL.B.) on the subject, besides making the usual researches, with the result that the statement at the head of this paragraph is proved to be incorrect. The language of the articles in *Cham. Ency.* and *Harms. Ency.* is very technical, but the following extract from the latter may be intelligible to some, " What are popularly called entailed estates in England are settled estates, and by settlement the fee-simple ownership of the land cannot be postponed by the creation of successive limited interests beyond the term of a life or lives in being at the date of the settlement, and an additional period of twenty-one years."

That in order to Publish a Work and Preserve the Copyright of it, it is necessary that at least one copy of the book be sold.

On writing to the authorities at the Copyright Registry, Stationers' Hall, Ludgate Hill, we received the following reply, dated April 5, 1906 :—

" A work can be equally well published by a gratuitous circulation of copies as by a *sale* thereof."

The writer, before he knew the law on the subject, has on one or two occasions obliged a friend and author of pamphlets by buying copies of such pamphlets from him for a couple of pence each, it being explained at the time that so long as the work was *sold* the adequacy of the sale price did not matter.

That a Creditor can Arrest or detain the Body of a Deceased Debtor

It is almost incredible that a creditor should wish to arrest or detain the body of his debtor, but the idea is certainly prevalent, and *Cham. Ency.* specifically mentions it as a popular error in the article on *Burial*, Vol. II., p. 558. If a defendant in an action at law die after judgment has been given, then

execution may be had, by leave of the Court, upon his goods in the hands of his representatives, but his body is not, for such purposes at least, considered as part of his goods.

That "Findings are Keepings."

By "findings are keepings" is, of course, meant that if a person find anything he becomes the rightful owner thereof as against all other parties. A case was reported in the Press of Sept. 23, 1901, in which a man had found a mackintosh on the seat of a tramcar and refused to give it up to the owner. The case was dealt with at the Lambeth Police Court, and the magistrate (Mr. Francis) consented to treat it as "unlawful possession," and imposed a fine of 20s. with the option of 14 days' imprisonment, remarking that the prisoner had no more right to the mackintosh than he had to put his hand into a man's pocket. Mr. Percy Robinson, in prosecuting, said, "There is a very popular belief that findings are keepings, and an extraordinary number of people believe that if they find anything anywhere, except in a private house, they are entitled to kep it." Against this, however, we find it stated in *Every Man His Own Lawyer*. p. 96, "Whoever finds a lost article (not being treasure trove) is entitled to the possession of it as against all parties but the real owner." Other cases are where a carpenter had a bureau sent to him for repair, and he found 900 guineas in a secret drawer which he appropriated to his own use, it was held that he was guilty of felony; while if a man purchase a chattel and afterwards discover valuables concealed in it he does not thereby acquire a right to them.

Where the article or coin found is made of gold or silver and the owner is not known, the Crown is entitled to it, no matter whether it was found hidden in private property, highways, etc., in England and Ireland, for such articles are "treasure trove," but of recent years it has been the custom of the Crown to give the finder the intrinsic value of the treasure in current coin.

"Treasure trove" was dealt with fully in several articles in *Notes and Queries* of June, July and August, 1916.

"The law of treasure trove is eagerly canvassed, but the local decision is to make over the coins to the Receiver of Wreck. The wording of the law is as follows:—

"'Jetsam, flotsam, lagan, or derelict found in or on the shores of the sea or any tidal water are included in the term wreck,' and as such must be handed over to the Receiver of

Wreck, who must hold an inquest on them. But the point in dispute is whether they were found above high-water mark, in which case they *belong to the lord of the manor*, or between high-water mark and low-water mark, when they belong to the *Crown* and the finders will be rewarded as for salvage. The finders for the most part assert that they were found below high-water mark ; and 55 coins are being at once forwarded to the Receiver of Wreck at Ipswich."—*Daily Mail*, Apr. 6, 1911.

That if a person pick up anything in the street, he is legally bound to give notice thereof to the police or other authority

This is true only in the case of treasure trove, *i.e.*, money, coin, gold, silver, plate, or bullion found hidden in the earth or other private place and the owner thereof being unknown, for it is contempt against the Royal prerogative to conceal treasure trove, and such concealment was formerly punishable by death, but now by fine or imprisonment. In the case of a driver or conductor of a public vehicle finding any property in such vehicle, he is bound to take it to the lost property office in charge of the police, and if the owner afterwards claims the goods he has to pay a certain percentage of the value of them to the police, who give such sum to the finder. If the goods are not claimed within a certain period the finder becomes the owner of them. On finding anything in a public highway it *is* legally incumbent on the finder to try to find the owner, but providing he does this it is not necessary for him to hand the article over to the police, though, no doubt, that is one of the most likely methods of restoring the property to its owner.—*Vide* " That Findings are Keepings," above.

That Imprisonment for Debt has been entirely abolished

The Home Secretary was reported by *The Globe*, July 21, 1910, to have said, in the House of Commons the previous night :—

" I have given the matter of imprisonment for fines some attention lately, to see if we could not ensure a period of grace before a fine was enforced by imprisonment.

" There were 90,000 persons committed to prison last year in default of payment of fines. Of these, 13,000 to 14,000 paid their fines, in whole or in part, after they had been committed to prison.

"A much larger number could have paid if they had a reasonable time to enable them to get the money."

Now, a fine, though a particular kind of debt, is not the kind of debt we have in mind when reading the heading of this article, and we will at once proceed to deal with debts other than fines. Imprisonment for debt is said to have been abolished by the Debtors' Act of 1869, but for all this we find (vide *Imprisonment for Debt*, pub. at 1d. by the Humanitarian League in 1907) that in England in 1905, 20,290 persons were in fact so imprisoned because the Act of 1869 provides for six exceptions, one of which is a debt for which a judgment summons has been obtained, and this particular exception accounted for 11,427 of the aforesaid 20,290 cases. In 1906 12,014 persons were sent to prison under judgment summonses. In 1913 the total number of debtors sent to gaol was only 5,711. Judge Parry deals with the matter in his *The Law and the Poor.*

The period of imprisonment in such cases may be six weeks, and does not operate as a satisfaction or extinguishment of the debt. If, however, a plaintiff has a good cause of action for an amount of £50 or more and the defendant is about to quit England, upon satisfactory proof, etc., to that effect, such defendant may, by order of a judge, be arrested and imprisoned for a period not exceeding six months, unless he give security for the amount claimed.

The judge will not, as a rule, commit a debtor to prison unless he is satisfied the man has sufficient means to enable him to pay. In fact, it is more a case of imprisonment for obstinacy than for debt! Further, usually a second judgment summons has to be obtained before a committal order is made, and even then the judge will probably say, "Fourteen days, suspended for a month," so as to give the debtor a final chance of paying. The pamphlet previously referred to takes the view that imprisonment even under a judgment summons should be abolished. Apparently the writer has been in the happy position of never having had to attempt to get money out of a man who does not wish to pay, in spite of means and the justice of the debt! Such a debtor, too, is not without assistance, for in addition to solicitors, a book has been published with some such title as *Five Hundred Ways of avoiding Payment of Debt*—in fact, the chances of the debtor or creditor succeeding seem very evenly balanced!

It may be as well to remind creditors that if they wilfully and with intent to defraud make any false claim or untrue declaration or statement of account, they are guilty of misdemeanour, and are liable to a *year's* imprisonment.

That a True Statement can be a Libel

" That is no slander, sir, which is a truth."
Romeo and Juliet ; IV., i., 33.

Few will dispute the commonness of this fallacy. Not only do most people believe that the truth may be a libel, but frequently one hears the statement " the greater the truth the greater the libel " ! The facts are that to prove the statements (concerning which the libel action is brought) *true* is a complete answer to a *civil* action, and judgment will be given for the defendant, whether the publication of such truths has done the plaintiff harm or not. " A person who has published a libel or uttered a slander of another is, *prima facie*, justified in law, and exempt from *civil* responsibility, if that which he has uttered or published is true, but the burden of proving it to be true lies upon the person so speaking or publishing it. . . No person is justified in repeating and publishing a slanderous rumour unless he can show that such repetition was made on a justifiable occasion or that the rumour was true."—*Every Man His Own Lawyer*, p. 327. " It is a complete answer to an action for defamation to prove the truth of the alleged slander or libel."—No. 780 of *One Thousand Legal Facts*, by Q.C.

" A master or mistress is privileged in making a defamatory communication to a *bona fide* inquirer respecting the character of a servant, if it be made truthfully and without malice, the general rule being that, unless the contrary be expressly proved, it will be presumed that the communication was made without malice. The plaintiff, to support the action, must prove that the character was both falsely *and* maliciously given."—*Ibid.*, p. 329. The case of Steggles *v.* Hanson, before Mr. Justice Darling, in the King's Bench Division (Dec., 1911), illustrates the matter very clearly. It was reported thus in the *Daily Telegraph*, Dec. 20, 1911 :—

" STEGGLES *v.* HANSON.—Mr. Hume Williams, K.C., applied for judgment in this case, which was an action for libel and slander brought by Miss Eleanor May Steggles against Lady Hanson, widow of Sir Francis Hanson, of Eastley End, Chertsey.

"The jury answered questions put to them by his lordship as follow :—

"Is the letter written by defendant to Mrs. Bulkeley Johnson true ?—Yes.

"Is the letter written by defendant to Miss Laking true ?—Yes.

"Are the words spoken by defendant to Miss Laking true ?—Yes.

"Was defendant actuated by *malice* in writing either or both of the letters ?—*Yes*.

"Was defendant actuated by *malice* in speaking to Miss Laking the words proved to be spoken to her.—*Yes*.

"What damages ?—£5.

"His lordship said there must be judgment for defendant. The jury had found that the libels were true, and the answer to the question as to whether Lady Hanson was actuated by *malice* was only needed if the libels and slanders were held to be a privileged communication. As the libels were found to be true, it was not necessary for him to decide any question of a privileged occasion, because it did not arise. The answer with regard to malice was supererogatory.

"Judgment for defendant, with costs."

It is to be particularly noticed in this case that it was decided the statements were *maliciously* spoken, but even so judgment was given for the defendant because it was also proved that the statements were *true*.

In the libel action of Lord Alfred Douglas *v*. Mr. Arthur Ransome (author of *Oscar Wilde : A Critical Study*) and *The Times* Book Club, and reported in the daily Press of Apr. 23, 1913, Mr. Justice Darling gave the jury the following set of questions to answer which they did in the manner indicated :—

(1) Are the words complained of by the plaintiff and printed on page 157 of the defendant Ransome's book *a libel* on the plaintiff ?—Yes.

If so, are they true ?—Yes.

(2) Are the words complained of by the plaintiff and printed on pages 182 and 183 of the defendant Ransome's book *a libel* on the plaintiff ?—Yes.

If so, are they true ?—Yes.

(3) Are the words complained of by the plaintiff and printed on page 196 of the defendant Ransome's book *a libel* on the plaintiff ?—No.

(4) Were the defendants *The Times* Book Club guilty of negligence in circulating or selling the book ?—No.

His lordship entered judgment in favour of both defendants, with costs.

Judgment being entered for the defendants means that as the statements published by them were true, that was a complete answer to the action for libel brought against them by the plaintiff Lord Douglas.

Discussing the question of civil libel, a barrister said, " If you say something against a man and can justify it no action for slander lies, but different cases call for different degrees of justification. If you are asked by an employer about the character of a man who has been in your service and you say that he drinks, the question of privilege arises, and even if you were to some extent mistaken it would be difficult for the man to establish an action against you unless he could prove that you were actuated by malice.

" But if you made the statement at large and were taken to court you would have *to prove its truth to the hilt ;* the mere utterance of the words would be set up as an indication of malice on your part."

Mr. Justice Darling, speaking at the dinner of the Society of Authors on Dec. 5, 1912, was reported to have said :—

" You can secure absolute immunity and write as many libels as you like without paying any damages to anybody if you form the Society of Authors into a trade union ; and there is no reason why you should not include all the newspapers of the day and publish everything not under the author's name, but under the name of the trade union."

Mr. G. Herbert Thring has pointed out to me that railway companies are no longer allowed to publish the *names* of passengers convicted of fraud against them. They used to publish the names and statements as to the nature of the frauds. All true no doubt, but these are now held to be cases of *criminal* libel, and the fact that the passenger has been fined or imprisoned for his wrongdoing is held to wipe out the offence, and consequently that he should not be further punished by having his name and offence placarded in railway trains and stations.

That a Stipendiary Magistrate is simply a Magistrate who is in receipt of a salary for his services

" In a case before Mr. Mead at West London Police Court yesterday, in which a boarding-house keeper was summoned

for illegally distraining on a piano in possession of a former boarder. Mr. Leslie Smith, in opening the case, said by the Law of Distress Amendment Act, proceedings could be taken before two J.P.s or a stipendiary magistrate.

" Mr. Mead : I am not a stipendiary magistrate. I am a Metropolitan Police magistrate. A stipendiary magistrate is the paid magistrate at different places and in big cities, created under a particular Act. It doesn't mean simply a magistrate who is paid. Otherwise, a chief justice or a recorder or a coroner would be a stipendiary magistrate. Metropolitan magistrates were created long before stipendiary magistrates were heard of.

" Mr. Cassels, defending, said he did not wish to raise that particular point, so Mr. Mead allowed the matter to drop, observing that he did not suppose the framers of the Act meant to exclude metropolitan magistrates."—*Daily Mail*, June 25, 1914.

Harms. Ency. states that stipendiary magistrates are appointed by the Home Office in municipal boroughs and in places having a population of 25,000. They have all the powers of two justices of the peace. Under the Municipal Corporations Act, 1882, they are required to be barristers of seven years' standing, and under the Stipendiary Magistrates' Act, 1863, of five.

That in the case of a Riot, the Officer in Command of Troops may not order his men to fire on the people without the Riot Act being previously read

" When a riot becomes formidable, any justice of the peace may command the persons assembled, if not fewer than twelve in number, to disperse peaceably by a form of words called reading the Riot Act (1 Geo. I., Chap. 5), thus : ' Our Sovereign Lord, the King, chargeth and commandeth all persons being assembled immediately to disperse themselves, and peaceably depart to their habitations, or to their lawful business upon the pains contained in an Act of King George for preventing tumult and riotous assemblies. God save the King ! ' (The omission of these last four words makes the reading nugatory.) If the rioters present at the reading or after it is made remain more than one hour, force may be used to disperse them, and though death or wounds result to those composing the mob such hurt is not a criminal offence. Also

the rioters are guilty of felony and are liable to penal servitude for life."—*Cham. Ency.*, Vol. VIII., p. 731.

Regulation 967 of the *King's Regulations and Orders of the Army, 1908*, provides for such a case in the following words :—

"It is possible for extraordinary cases to arise of immediate and pressing danger—when violent crimes are being or are likely to be committed which in the opinion of the officer demand his immediate interference. In these emergencies the officer should take such action as he thinks necessary, although he has not received any direction from a magistrate, whether the absence of such direction is due to a magistrate not being present or to any other cause."

That when a Magistrate has read the Riot Act the Officer in Command of Troops is bound to take action, either ordering his men to fire or to charge

The quotation from *Cham. Ency.* given in dealing with the preceding fallacy answers this one, for it is there clearly stated that one hour after the reading of the Riot Act "force *may be* used to disperse them." It does not say it *shall be* used. A riot is not the same as an unlawful assembly. When three or more persons assemble to commit a breach of the peace they form an unlawful assembly and may be prosecuted for having committed a misdemeanor, which is a less crime than a felony. A riot is a riotous assembling of three or more people. Thus an unlawful assembly becomes a riot directly the people start using force or violence, or even have an apparent tendency to use it calculated to inspire people with terror. Even if only *one* of His Majesty's subjects be terrified it becomes a riot! The riotous assembling of 12 or more persons to the disturbance of the peace is a misdemeanour, and it is not till one hour after the Riot Act has been read that an act then committed becomes a felony. The effect of the reading of the Riot Act is, therefore, twofold; it enables any act committed at least one hour after its reading to be treated as a felony, and it exonerates those who may cause death or wounds in dispersing or attempting to disperse the rioters.

That the Royal Marriages Act prevents the Marriage of Members of the Royal Family with English Women

John Timbs, p. 122, *Things Not Generally Known*, 1st Ser., quotes Sir John Campbell, Attorney-General, thus, "There is

a common but erroneous idea abroad that the Royal Marriages Act prevents the marriage of the members of the royal family with English women. The statute enacts that no descendant of George II. (other than the issue of princesses married into foreign families) should marry any subject without the consent of the reigning sovereign, signified under the great seal ; and if the marriage be contracted without such consent, it is void. Provided, however, that such descendants as are above the age of 25 may, after a twelvemonth's notice given to the Privy Council, marry without the consent of the Crown, unless both Houses of Parliament before the end of such twelvemonth declare their disapprobation."

That the Sovereign signs some instrument ("Death Warrant") by virtue of which Capital Offences are punished by death

A question on this point in *Notes and Queries* in 1916 resulted in several replies, including a couple of long ones from the veteran lawyer, Sir Harry B. Poland. The following are merely extracts from the replies :—

"The King does not sign 'death warrants.'" "The 'N.E.D.' gives as an illustration of the word 'death warrant,' a quotation from *The Queen's Resolve*, by C. Bullock, which is as follows :—'Before Parliament relieved her of the necessity, she [Queen Victoria] had to sign the death warrant of all prisoners sentenced to suffer capital punishment.'" "It is curious that this is a mistake, for the Queen never had to sign a death warrant." "Pulling, in *Laws and Customs, &c., of London*, in defining the duties of the Recorder of London, states (p. 18) :—'At the conclusion of each session [of the Central Criminal Court] he prepares a report of the case of every felon capitally convicted within the City of London and County of Middlesex for the information and consideration of the Queen in council, and afterwards attends to take the directions of the Crown, under advice of the Privy Council. It then becomes the duty of the Recorder to issue his warrant for the reprieve or execution of the Criminal . . .'

"Even in a case where a sentence of death has been passed in the High Court of Parliament before His Majesty, the sentence is always put in force by a writ from the King under the Great Seal of Great Britain, but the King does not sign such writ."—Sir Harry B. Poland, at p. 111 of *Notes and Queries*, Feb. 5, 1916.

"I do not know if the King personally signed the 'Recorder's Report,' but at all events His Majesty did not sign any execution orders in respect of capital convictions on circuit."—Eric Watson, at p. 112, *ibid.*

"What is commonly understood as a death warrant is a document, signed by the sovereign and addressed to the Sheriffs and Governor of the Gaol, which orders them to carry out the sentence of death passed by a court of law on a criminal, and without which the sentence could not be carried out. No one has yet been able to give a reference to such a document."—Sir Harry B. Poland, at p. 210 of *Notes and Queries*, March 11, 1916.

This fallacy was refuted by John Timbs, F.S.A., in his *Things Not Generally Known*, First Series (1860), p. 172.

That the Law does not require Brown Bread to be sold by weight, as it does White Bread

The author wrote on November 11, 1915, to the Public Control Dept. of the London County Council, 21, Northumberland Avenue, W.C., and the following reply, dated November 15, was received:—

"Bread Act, 3 George IV., cap. 106.

"SIR,—I have to acknowledge the receipt of your letter of the 11th instant, and to inform you that the above Act provides that bread, other than fancy bread, should be sold only by weight, but it does not define the weight in which loaves should be made, and a baker may make and sell bread in any weight or size he pleases. By custom, a half quartern loaf is understood to weigh 2 lb., and if you desire to purchase loaves by weight you may require the baker to weigh the bread at the time of sale and satisfy yourself that the correct weight is received.

"I enclose for your further information copy of a notice issued by the Council on the 'Sale of Bread.'"—I am, Sir, Your obedient Servant, J. OLLIS, Chief Officer.

From the enclosed notice the following are abstracted:—

"Loaves under 2 lb. (but over 1 lb.) in weight and sold as twopenny (2d.) loaves must be weighed."

"Fancy bread must be different in appearance, shape, and size from ordinary household bread."

"Numerous convictions have been obtained by the Council for selling brown bread in other manner than by weight."

" There is no satisfactory definition of fancy bread, but the Council regards small bread made up in any shape or weight of *less than 1 lb.* as being *fancy bread* that need not be sold by weight."

" . . . . bread must be weighed in the presence of the purchaser, whether in a shop or on delivery from a cart."

That a Cheque, Agreement, or other Document signed on a Sunday is void

This *may* have been so in the days of the Puritans, but it is not so now. Section 13 of the Bills of Exchange Act of 1882 provides that a bill is not invalid by reason only that it is ante-dated or post-dated, or that it bears the date of a Sunday, and the same statement is true in regard to cheques.

That the Fourth of July is a Legal National Holiday of the United States of America

Strange as it may appear, the Act was never passed making it one, though it is " kept " of course, as the record of damaged hands and eyes used amply to confirm until the law stepped in and stopped the indiscriminate use of fireworks.

" Thanksgiving Day "—the last Thursday in November—is the only legal National Holiday in the United States.

That if a Lease were made for a period of 100 Years instead of 99, the Tenant would become the Owner of the Freehold of the Property

The reason for the 99 years is to avoid the larger stamp duty that is payable for a lease of *over* 100 years, and the 99 is to prevent quibbling on the part of some Government official (if that be possible !) whether 100 is over 100.

Vide *Principles of the Law of Real Property*, Williams, Pt. IV., Chap. 1, " Of a Term of Years."

That an Alleged Murderer Cannot be Convicted unless the Body of his Victim be Produced

Without the production of the body, the person alleged to be murdered might be alive, but in the case of the French " Blue Beard," Landru, although there were about a dozen victims, not even a portion of any one was produced, and Landru was executed. In the Dr. Crippen case only a small

portion of a body was produced, which was supposed (probably correctly) to belong to the victim. Crippen was executed. A barrister says that many years ago two shipwrecked sailors *ate* a cabin boy, and were hanged for it, though obviously in that case the body could not be produced!

That in Order to Commit a Trespass, you or something belonging to you must go on to the Property of someone else

Mr. W. H. Upjohn, K.C., and Mr. L. J. W. Farwell (now K.C.) said in Nov., 1922, that if you dig a large hole on *your own* property, close to that of your neighbour, and *his* land or house falls into *your* hole, *you* have committed a trespass. Such are the humours of the law!

HISTORY.

That the Diving Bell was invented by Sir William Phipps

"Sir William was one of the first persons who used the bell advantageously, in recovering nearly £300,000 treasure from a Spanish wreck, near the Bahamas. The *invention*, or the earliest use, of the diving-bell was upwards of a century before the birth of Phipps; the first instance of its use being at Cadiz, in the presence of Charles V., in 1538, whereas Phipps was born at Pemaguid, in America, in 1650. There is likewise a popular American opinion that the Mulgrave family is descended from Sir William Phipps, which is a mistake; the founder of the Mulgrave family being C. John Phipps, one of the earliest explorers of the Arctic regions."—J. Timbs, *Popular Errors*.

That Columbus discovered North America

We take the following particulars from the article on "Cabot" in *Ency. Brit.*, "Sebastian Cabot, born about 1476 at Bristol, England. First patent granted March 5, 1496 (11th Hen. VII.) to 'John Gabote, citizen of Venice; to Lewes, Sebastian, and Santius, sonnes of the said John.'" John and Sebastian sailed from Bristol in 1497. There is, in the account of the Privy Purse expenses of Henry VII., the following entry, "10th Aug., 1497. To him that found the New Isle, £10." The most precise account of the discovery is from a map drawn by Sebastian Cabot, and engraved in 1549 by Clement Adams, which is known to have hung in Queen Elizabeth's gallery at Whitehall. The notice runs as follows: "In the year of Our Lord 1497, John Cabot, a Venetian, and his son Sebastian, discovered that country which no one before his time had ventured to approach [Columbus had certainly *approached* it in 1492.—Ed.], on June 24, about five o'clock in the morning. He called the land *Terra prima visa*, because, as I conjecture, this was the place that first met his eye in looking from the sea. On the contrary, the island which lies opposite the land he called the Island of St. John—as I suppose, because it was discovered on the festival of St. John the Baptist."

A second " patent " to John Cabot, dated February 3, 1498, authorised him to take six English ships, of not more than 200 tons, in any part of the realm, " and them convey and lede *to the land and isles* of late found by the said John in oure name and by oure command." As to what happened to this expedition, and to John Cabot, the authorities appear to be in doubt. Some say John Cabot sailed from Bristol in May, 1498, with five vessels, and that nothing more was ever heard of him or them. Others say John Cabot died in 1498, and that his son Sebastian sailed with the five ships in May, 1498.

Sebastian Cabot brought to England three native inhabitants of the countries he had visited. His great achievement was the discovery of 1,800 miles of sea-coast of the South American continent. Sebastian Cabot is supposed to have died in London in 1557. The place of his burial is unknown, and we are indebted to Eden for the death-bed scene of this intrepid navigator, who with his father saw the American continent before Columbus or Amerigo Vespucci.

From the article on " Columbus " in *Ency. Brit.* we take the following, " Christopher Columbus (*c.* 1436-1506) was born at Genoa. He set sail from Palos, on the river Tinto in the south-west of Spain, with three ships on Friday, Aug. 3, 1492. On Friday, Oct. 12, 1492, was sighted the *island* called by the Indians Guanahani, and named by Columbus San Salvador ! This has now been identified with Watling Island. On his third voyage he beheld, on Wednesday, Aug. 1, 1498, for the first time, the *mainland* of South America, the continent he had sought so long. He does not appear to have landed."

From the article on " America " we excerpt the following, " It is singular that America should have been visited by one of the most enterprising nations of Europe five centuries before the time of Columbus [this implies that he re-discovered it !—Ed.] without awakening the attention of either statesmen or philosophers. Iceland was discovered about 860 and colonised by the Norwegians in 874. About 50, or, according to other accounts, 100 years later, the same people planted colonies in Greenland. Whoever looks on the map of Greenland, and reflects on the fact that the Norwegians must have been ascending through Davis' Straits as high as the seventy-third parallel [where the *runic* inscription was found], annually, perhaps for two or three centuries, will admit that, with half the spirit of enterprise which had carried

them so far, the discovery of some portion of the west coast of these straits was almost unavoidable. Now, the position and direction of this coast once known, it required no great effort to trace it southwards to Labrador and Newfoundland."

Dr. Fridtjof Nansen, in his *In Northern Mists*, 1911, gives the credit of the discovery of America to the Norwegians 500 years before the time of the Cabots and Columbus.

Dr. S. E. Dawson, F.R.S., of Canada, has also pointed out that it was Cabot, and not Columbus, who discovered North America ; and there is a paper on the subject by Mr. Fleming, published in the *Journal of the Royal Colonial Institute* (January-July, 1869).

" Almost fourteen months before Columbus in his third voyage came in sight of the main . . . he [John Cabot] discovered the western continent."—Bancroft, *Hist. United States*, Vol. I., page 9.

At p. 11 of *Outlines of English Industrial History*, by Dr. Cunningham and Miss McArthur, we read, " We may learn how great their [the Danes'] prowess was from the records of their voyages to Iceland, Greenland, and *America* . . . ." While at p.114 of the same work the "re-discovery of America" is referred to.

Chamb. Ency. puts the matter in the proverbial nutshell, thus, " Cabot, or Cabotto, Giovanni, discoverer of the North American mainland."

" Columbus, Christopher, a great navigator, especially distinguished as the discoverer of the New World."

Mr. C. E. Clark says (p. 201), " *Sebastian* Cabot is still described as the discoverer of America. The Sebastian thesis was undermined years since, and exploded a little later by Mr. Weare, whose account of the Cabotian voyages is undoubtedly the most complete which England has produced." Weare says, " The undoubted discoverer was the never to be forgotten *John* Cabot." For an account of the voyage of Eric the Red long before 1492, Vide *Finding of Wineland the Good* by Arthur Reeves.

Sir Thomas Browne, M.D. (*Vulgar Errors*, Book II., Chap. 2) says, " And therefore as some observe, if Columbus, or whoever first discovered America, ... For Columbus knew not the variation of the compass, whereof

Sebastian Cabot first took notice, who after made discovery of the Northern part of that continent."

The inscription on the pedestal of the Columbus statue in Columbus Circle, New York City, is :—

" Joy and Glory
Never uttered a more thrilling call
Than that which resounded
From the Conquered ocean
In sight of the first American island
Land ! Land ! "

The Cyclo. of Names calls Christopher Columbus ' the discoverer of America,' but further on says, " . . . . he discovered Trinidad (July 31), and the lowlands at the mouth of the Orinoco (Aug. 1st), this being, in all probability, the first discovery of the Continent of South America ; the Cabots had already seen North America."

The *Harms. Ency.* also agrees that Christopher Columbus discovered South America in 1498, and that John Cabot discovered North America on June 24, 1497.

That the following Popular Quotations are from the Bible

From *To-day* of Nov. 9, 1895, we extract the following :—

" Among the popular quotations which are falsely attributed to the Bible are the following :—

' The merciful man is merciful to his beast.'—The Scripture form is : ' A righteous man regardeth the life of his beast.'

' Money is the root of evil.'—Paul's version is : ' The love of money is the root of all evil.' "

EXPLODED LEGENDS. By ALAN OSCAR

" Exploded Legends," by Alan Oscar, in *To-day* of June 20, 1896 :*—

" Careless historical writers are responsible for many legends which, delightful in themselves, are no more ' history ' than the story of Jack and the Beanstalk. The more critical methods of to-day have exploded many such stories, as, for

* By kind permission of Mr. Jerome K. Jerome and Mr. Alec Oscar.

example, that of William Tell and the apple, much to our loss, no doubt.

"We used to be taught—and, doubtless, are still in many places—that, until about six thousand years ago, there were no human beings on this earth of ours: modern Asiatic scholars tell us that Egypt's first *historical* king reigned at this date, and that before him are shadowy lists of many earlier monarchs; whilst Chaldean history has an actual recorded date of 3,750 B.C. which is authentic, and it is known with certainty that the nation was in existence hundreds of years previously.

"One of the choice classical stories of our schooldays showed us the great Roman General Belisarius, in his old age, a beggar for the alms of the passers-by; whereas, in fact, he died in the enjoyment of all his wealth and honours, as was meet for him who held Italy for the Empire against the armies of the Goths."

In addition to what Mr. Oscar has written in the last paragraph, we have found the following:—

". . . . Belisarius was at length accused of conspiracy against Justitian, and imprisoned (563); but Justitian, becoming convinced of Belisarius's innocence, restored him after six months to all his honours. He died 565. Tzetzes, in the 12th century, was first to aver that, during his half-year's imprisonment, Belisarius suspended a bag from the window of his cell, and exclaimed to those who passed by: 'Give an obolus to Belisarius, who rose by merit, and was cast down by envy!' Lord Mahon, in his *Life of Belisarius* (London, 1829), endeavours, but without success, to confirm the tradition of Belisarius being deprived of sight and reduced to mendicancy—a fiction given in Marmoutel's romance, which supplied the painter Gérard with the subject for a fine picture."—*Chamb. Ency.* (1906).

"As not unfrequently happens, the circumstance which has most enlisted our sympathies with it proves on investigation to be a mere fiction . . . . it is a story inconsistent with the facts of history, invented, apparently, several centuries after the period at which it was supposed to have occurred, and first mentioned by John Tzetzes, a Greek writer of no authority, who lived in the twelfth century.

"The story of his blindness and being reduced to beg is a fiction."—*Dic. of Biog.* (1831), by R. A. Davenport.

See also the *Life of Belisarius* by Lord Mahon (2nd ed. Murray, 1848).—*Book of Days*, Vol. I., p. 363.

*" Khufu, the Cheops of our boyhood, has been traduced as a despicable oppressor in that he compelled his people to build that stupendous pyramid which to this day remains the grandest monument ever erected; but more careful inquiry reveals the fact that it was, more probably, a 'relief work,' which found employment for a large number of men out of work by reason of the inundation of the country during the period of the overflowing of the Nile.

" Historical records rob us of the romantic story of the taking of Babylon. We used to be told of a war, a siege, an heroic defence; and, on the part of Cyrus, a stroke of genius by which victory was at last obtained—that at dead of night he turned the course of the Euphrates, and marched his army along the river bed; that revelry in the city on this annual feast-night had begotten carelessness; the river gates had been left open, and the Persian army marched in! Daniel, who gives us the dramatic scene of Belshazzar's feast, carefully omits all this, and he is right. The actual official records of the time fully confirm each other, and give us the true story. They tell of treason and revolt within the city, and voluntary surrender by the powerful priesthood, peaceful occupation, and a triumphal entry.

" So also with Sardanapalus, the 'last' King of Nineveh, whom Byron immortalised. According to 'history,' he was an effeminate tyrant, spending his life in the luxury and idleness of his harem; ending his days at the last by an heroic fight for his crown, and—being overpowered—burning himself and his wives on an immense pyre. His name was Assurbanipal; he was not the last King of Nineveh; he was a brilliant warrior and hunter; he overpowered Babylon and Elam, and, under him, the kingdom flourished in every way. It was at least twenty years after his death that Saracos, the *last* King of Assyria, was defeated by the allied forces of Media and Babylon.

" Coming to later times, we have all heard of the peculiarly chaste city of Cologne, Saint Ursula, and eleven thousand virgins. Unpitying criticism tells us that the legend is the result of misreading a Roman inscription, or, possibly of a name 'onesimilla,' which some wiseacre tortured into 'undecimille'—eleven thousand. Fancy, eleven thousand virgins

* Quoting Mr. Alec Oscar again.

in a little town of those days! We have been taught to look on the Goths as ruthless destroyers of beautiful things, much in the same way that Cromwell is credited with the destruction of the images in our cathedrals. The truth is that we are indebted to the great Theodoric, King of the Goths, for the preservation of many noble Continental buildings.

"In the same manner it has been dinned into us that had not the Christian heroes stayed the influx of the Mahommedans Europe would have been uncivilised to this day. But it does not follow. The only European civilisation worthy of the name before the Renaissance was in the Moorish kingdom, in Spain, where culture of every kind flourished, whilst the rest of Europe was just waking from savagery.

"Even in modern English histories we find these legendary myths. In the account of the defeat of the Spanish Armada we used to read—and still may do so—of a certain hero, David Gwynn, who is said to have captured a galley, *Bazana*, after the vessel, *Diana*, in which he was a slave, had sunk. It is all a myth. The *Diana* drove on shore at Bayonne, and Gwynn escaped from her. He made his way to England, and, being able to speak Spanish, was sent to Ireland to assist in the examination of the Spanish prisoners. From thence he was expelled as 'a liar, thief and lewd person.'

"How many writers have, of late, disposed of the two Waterloo 'fags'—'The guard dies, but does not surrender,' and 'Up, guards, and at 'em!' Wellington's quiet 'Now, gentlemen, if you please,' sounds much more like truth.

"In the thirty-fifth century, our descendants may, perhaps, read how Sir Jameson Rhodes defied the full force of Germany, boldly marched into the Transvaal, and, with a handful of noble British troops, rescued his fellow-countrymen from the vile hands of the Boers; and how Sir Alfred Austin raised himself by his magnificent genius to the proud position of Poet Laureate, completely overshadowing his somewhat effeminate predecessor, one Tennyson."

That Dr. Guillotine invented the Guillotine, and that he was the First to suffer by that Machine

"Some ascribe the invention of the machine to the Persians."

"Dr. Guillotine was born on May 28, 1738; recommended the use of a machine for the purposes of execution

on December 1, 1789, and this caused his name to be attached to it.

" It has often been stated that Dr. Guillotine perished by the instrument which bears his name, but it is beyond question that he survived the Revolution, and died a natural death in 1814."—*Ency. Brit.*, XI., 263.

[The mention of " natural death " reminds us of the old lady on her death-bed and surrounded by medical men, saying, " Oh, doctors ! may I die a natural death ? "]

Ency. Brit. tells us that the guillotine was used for the first time on April 25, 1792, a highwayman named Pelletier being the victim, and that " previous to the period when it obtained notoriety under its present name it had been in use in Scotland, England and various parts of the Continent. There is still preserved in the Antiquarian Museum of Edinburgh the rude guillotine called the ' maiden,' by which the regent Morton was decapitated in 1581." Gibbet Lane, Halifax, was still in existence on Mar. 8, 1917, which commemorates the Halifax gibbet, a decapitating machine.

Mr. C. E. Clark states that the guillotine was constructed by a German mechanic named Schmidt, under the direction of Dr. Antoine Louis, and was in consequence first called a Louisette. Mr. Clark also says that Dr. J. I. Guillotin was one of the founders of the Academy of Medicine in Paris, and that he died at the age of 76, on May 26, 1814.

T.P.'s Weekly (Jan. 22, 1909, p. 101) says, " It has often been claimed that poor Dr. Guillotin fell a victim to this machine. ' But,' says the Right Hon. John Wilson Croker, ' it was not so ; he was, indeed, imprisoned during the Jacobin Reign of Terror, his crime being, it is said, that he testified an indiscreet indignation at a proposition made to him by Danton to superintend the construction of a triple guillotine.' "

Thackeray falls into the error in his *Phillip*, Chap. XVI.

That Watt was the Inventor of the Steam Engine

We all know the touching story of Watt's childhood, in which an egg-cup, tea-kettle, and grandmother are the " properties " ; how he held the egg-cup in the jet of steam issuing from the spout of the kettle, saw the steam condense upon it, burnt his fingers, broke the egg-cup, and got into his grandmother's bad books for " being so idle," etc.

This thrilling story—we know one other, of George Washington's boyhood—no doubt is answerable for the fallacy

under consideration. Watt did *not* invent the steam-engine, but he greatly improved it. His greatest improvement consisted in having a separate condenser.

Prof. Unwin, F.R.S., had in his possession a photograph of a drawing of the Condensing Beam Engine erected by Boulton & Watt, of Soho, Birmingham, for Whitbread & Co., in 1785. Accompanying this photograph was a copy of the inscription on the engine, which was as follows :—

"The steam-engine was first invented by the most noble Edward Somerset, Marquis and Earl of Worcester, 1655. Improved by Captain Thomas Savery, 1699. Further improved by Thomas Newcomen and John Cawley, ingenious mechanicians, of Dartmouth, in the County of Devon, 1712.

"The expense in fuel reduced one-half by Mr. John Smeaton, F.R.S., of Austhorpe, in the County of York, civil engineer, 1768.

"Greatly enlarged in its powers and uses, and brought to its present state of perfection by Mr. James Watt, F.R.S., of the City of Glasgow, who received His Majesty's patent, 1769, and in conjunction with Mr. Matthew Boulton, of Birmingham, F.R.S., obtained an Act for the exclusive privilege for twenty-five years, commencing 1775.

"They erected this engine, which performs the work of thirty-five horses, 1785. But in the course of ten years' use more power being found necessary, this engine was altered to make it equal to the work of seventy horses, 1795."

This inscription on one of Watt's own engines does not claim that he was the inventor.

The engine was taken down in 1887 (to make room for a compound engine of E. A. Cowper's design and made by James Simpson & Co.), and we believe it is now in a museum in Australia.

There are two engines described in the *Pneumatica* of Hero of Alexandria (*c.* 130 B.C.), one of which worked on the same principle as "Barker's Mill," or a modern lawn-sprinkler. Between Hero and Somerset the names of three other philosophers occur in connection with the steam-engine, and they are, Giovanni Battista della Porta (1601), Solomon de Caus (1615), and Giovanni Branca (1629), the latter having invented the impact steam-turbine.

Harms. Ency. says, "The first steam-engine with cylinder and piston was no doubt the invention of Denis Papin (1690)."

"Watt, James, b. Jan. 19, 1736 ; d. Aug. 19, 1819.—In

1761-2 Watt made a series of experiments on the force of steam, using a Papin's Digester ; but it was not till the winter of 1763-4 that he began the investigations which ended in his improvement of the steam-engine."—*Cham. Ency.*, Vol. X., p. 579.

The monument to Watt in Westminster Abbey bears this inscription, " J. Watt, who, directing the force of original genius, early exercised in philosophic research, to the improvement of the steam engine. . . "

The foregoing evidence (and there is plenty more) should make it clear that Watt was not the inventor of the steam-engine, though it owes much of its early development to him.

That Galileo's Eyes were put out, that he was forced to wear a Hair Shirt by Order of the Ecclesiastical Court held in 1632, and that he uttered the Words " E pur si muove " as he rose after an Act of Outward Submission

That, to the great disgrace of his Romanist and Jesuitical persecutors, he was most shamefully treated we should be the last to deny ; but, the actual treatment being so bad, there is no need to exaggerate, and we are only too pleased to be able to refute the story of his eyes being put out, though, to add to his final misery, he did gradually lose the sight of both eyes by disease, and, commenting on this sad event, Galileo said : " So it pleases God ; it shall therefore please me also."

" Recent researches have considerably modified the old story of Galileo's persecution. It appears now that his attitude from the beginning was submissive ; that in 1616 the Inquisition simply pronounced the Copernican doctrine contrary to Scripture ; that, then, silence was not actually enjoined upon him, a fact, however, after falsified ; that at the second trial, in 1632, he was threatened with torture which was not executed ; that he recanted at command without really altering his opinion ; and that the story of his eyes being put out, of the hair shirt, and of *E pur si muove*, is altogether without foundation. Still the narrow-minded bigotry of Rome remains what it was ; it should also be added that a tardy submission to the inevitable did not come until 1822, when the general opinion of modern astronomers was allowed to be published in Rome."—From *Worthies of Science*, p. 41, by John Stoughton, D.D.

Vide *Galileo Galilei*, by Karl von Gebler (1879).

There is no reference to " It moves for all that " in a long account of Galileo in *Heroes of Science* (*Astronomers*), 1882, by E. J. C. Morton, B.A.

" The legend according to which Galileo, rising from his knees after repeating the formula of abjuration, stamped on the ground, and exclaimed, *' E pur si muove '* is, as may readily be supposed, entirely apocryphal. The earliest ascertained authority for it is the seventh edition of an *Historical Dictionary*, published at Caen in 1789."—*Ency. Brit.*, X., 34.

Galileo was born in 1564, died 1642, and recanted in 1633, so the story was " added," as frequently happens in such cases, 156 years after the alleged event, and that in the *seventh* edition of the book !

Vide p. 75, *Martyrs of Science*, by Sir David Brewster, F.R.S. ; and p. 145, *Discovery*, by Sir Richard Gregory, D.Sc.

That Napoleon I. was the Author of the Phrase " a Nation of Shopkeepers "

Adam Smith used it in his *Wealth of Nations*, which was written when Napoleon was seven years old. Dr. Brewer falls into this error, so does Wheeler in his *Names of Fiction*.

" When he (Napoleon) is most bitter he quotes Paoli, the real author of the famous phrase, ' They are a nation of shopkeepers.' *' Sono mercanti,'* as Paoli used to say."—Lord Rosebery, *Napoleon : The Last Phase*, p. 193.

" To found a great empire for the sole purpose of raising up a people of customers may at first sight appear a project fit only for a nation of shopkeepers."—Adam Smith, *Wealth of Nations*, Vol. II., Book IV., Chap. VII., part 3, 1775.

" And what is true of a shopkeeper is true of a shopkeeping nation."—Tucker, Dean of Gloucester, *Tract*, 1766.

That the Name of the Rich Man in the Parable of Lazarus and the Rich Man (*St. Luke*, Chapter XIV., vv. 19 to 21) was Dives

The simplest way to prove the fallacy is to turn to *St. Luke* XIV., vv. 19 to 21, when it will be found that no name is given to the " certain rich man."

Few fallacies of the non-scientific type can be more satisfactorily explained than this one. In older times the episode of the rich man and Lazarus was a favourite subject for

monks and others to paint, and the inscription was naturally enough in the "learned" language of the day, viz., Latin, and was thus "Dives et Lazarus," where, of course, "dives" means "the rich man," and the word would have been written with a small "d" had the inscription been "Lazarus et dives."

That the Original Cinderella wore a Glass Slipper

This deeply-rooted and pantomime-nurtured fallacy is one which can be convincingly explained. The "old original" Cinderella wore a fur slipper, a much more sensible foot-gear for a cold winter's night, especially when you want to dance and get back home to time without your guardian being any the wiser! In the original French the words were "pantoufle en vair"; these by their sound were mistaken for "pantoufle en verre," and thus "fur" was changed to "glass."

The *Cyclo. of Names* agrees that "vair" was mistranslated as "glass." Dr. Brewer (*Dictionary of Phrase and Fable*) says, "A curious blunder of the translator, who has mistaken *vair* (sable) for *verre* (glass). Sable was worn only by kings and princes, so the fairy gave royal slippers to her favourite."

The Folk-Lore Society has published 345 variants of the Cinderella story which were collected and abstracted by Miss Roalfe Cox!

> *If pall and vair* no more I wear,*
> *Nor thou the crimson sheen,*
> *As warm, we'll say, as the russet grey,*
> *As gay the forest-green.*

Scott's *Lady of the Lake*, Canto IV., Stanza XII.; Ballad to Alice Brand, last verse but one.

That there was a particular Mountain named Ararat on which Noah's Ark rested after the Flood

On referring to *Genesis* VIII., v. 4, we read that the ark rested on "the mountains of Ararat." Ararat was in fact a *district* which included some mountains, and these were spoken of as the "mountains of Ararat," just as we speak of the "mountains of the moon."

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* Fur.

Fallacy of Traditions

How little reliance is to be placed upon the traditions repeated to wondering sight-hunters by vergers and guides these few instances prove. They are by a Correspondent of *Notes and Queries*, No. 130:—

"In spite of Sir Samuel Meyrick's judicious arrangement of the armour in the Tower, the Beefeaters still persist in the old stories handed down. At Warwick Castle, the rib of the dun cow is ascertained to be the bone of a fossil elephant; and Guy's porridge-pot, a military cooking-utensil of the time of Charles I. St. Crispin's chair, carefully preserved in Linlithgow Cathedral by insertion in the wall, is of mahogany—an American wood! The chair of Charles I., at Leicester, bears a crown, which, having been the fashionable ornament after the Restoration, together with the form, betrays the date. Queen Eleanor's Crosses, it now appears, were not built by her affectionate husband, but by her own direction and with her own money. The fireplace and other objects in Belted Will's bedroom in Naworth Castle are manifestly of later date. The bedstead treasured up near Leicester as that occupied by Richard III. immediately before the battle of Bosworth, is in the style called Elizabethan. Queen Mary's bed, at Holyrood, is of the last century; and her room at Hardwick is in a house which was not erected till after her death; the tapestry and furniture, however, may have been removed from the old hall where she was imprisoned. The tower of Carnarvon Castle, in which the first Prince of Wales is supposed to have been born, is not of so early a period.

"There does not appear to be the least ground for the tradition that Vauxhall, or Fauxhall, was the residence of Guy Fawkes, except the common coincidence of names. Jane Vaux, or Faukes, mentioned in the History of Lambeth as holding a copyhold tenement at Vauxhall in the year 1615, was the widow of John Vaux. The infamous Guy, or Guido, was a man of desperate fortune, and not likely to have a settled habitation anywhere, much less a capital mansion. It appears, however, that the conspirators of the detestable plot in which he was concerned held their meetings in Lambeth, at a private house, which was accidentally burnt in the year 1635."—Lysons.

That Alexander Selkirk (on whose Adventures Defoe founded Robinson Crusoe) was shipwrecked on the Island of Juan Fernandez

Selkirk was a Scotch seaman, born about 1676, and he was *left* on the island by Captain Stradling in 1704, being provided with some food, clothes, weapons, ammunition and tools. He was taken off four years and four months after (February, 1709) by Captain Rogers, and brought to England. The whole incident is similar to that of the two brothers Stoltenhof, who willingly took up their residence on Inaccessible Island, and after a precarious life there were taken off by H.M.S. *Challenger* when on her celebrated voyage.

That Charles Darwin was the First to treat of the Origin of Species

Buffon (1707-1788) was the first in modern times to deal with this subject; then Lamarck (1744-1829). Then, in England, Dr. Erasmus Darwin—the grandfather of Charles Darwin; Geoffroy Saint-Hilaire, in France; and Goethe, in Germany, came to the same conclusion on the matter at practically the same time, viz., during the period 1794-5.

The most convincing evidence that it was not Charles Darwin is to read his own account of the facts in the "Historical Sketch" with which he begins his *The Origin of Species*, which was published in 1859, after he had devoted 22 years to the study of the subject! Even then its publication was somewhat hurried, because Dr. Alfred Russell Wallace, F.R.S., had arrived at similar conclusions to those of Darwin as to the origin of species. Charles Darwin's great discovery was a new and potent cause of the modification of species. He called the principle Natural Selection, but himself preferred the name Herbert Spencer afterwards gave it, namely, Survival of the Fittest.

That Dick Whittington came to London with a Domestic Animal called a Cat

From the *Dic. Nat. Biog.*:—"Whittington, Richard (*d.* 1423), Mayor of London, was son of Sir William Whittington and his wife Joan (*Monasticon*, vi. 740). . . . Nothing is known of Whittington's settlement and early life in London. The legend converts the Dorsetshire Knight, his

father-in-law, into a London merchant and his master, which Sir Walter Besant accepts as historical fact. But his first authentic appearance belongs to 1379, when he contributed five marks to a city loan (*Riley*, p. 534). . . . The old house in Hart Street, off Mark Lane, which used to be traditionally known as Whittington Palace, would seem therefore to have no claim to that distinction. . . . It has been Whittington's singular fate to become the hero of a popular tale which has found an ultimate lodgment in the nursery. [Then the story is given.] . . . The story of the venture of a cat leading to fortune is in one form or another very widely diffused. It has been traced in many countries both of Southern and Northern Europe, and occurs in a Persian version as early as the end of the thirteenth century. . . . The English version has more in common with the Scandinavian and Russian forms of the story than with those current in Southern Europe. It stands almost alone, however, in selecting an historical personage as the central figure. The "legend" of Whittington is not known to have been narrated before 1605. . . . The earliest extant references to the "legent" figure in Thomas Heywood's "If you know not me, you know nobody" (Act I., sc. i.), published in 1606, and in Beaumont & Fletcher's "Knight of the Burning Pestle," which appeared five years later. . . . "The various attempts to nationalize the legend, by dragging in the use of the word 'cat' as a name for ships carrying coals from Newcastle, a mere humorous suggestion of Samuel Foote, or by explaining 'cat' as a corruption of the French *achats*, fall to the ground when the real character of the story is recognised." . . . In a note referring to Samuel Lyson's life of Whittington, the writer in the *Dic. Nat. Biog.* says, " . . . . but the value of his work is marred by his acceptance of the legend as genuine biography."

Mr. C. E. Clark deals with this fallacy at pp. 36 and 37 of his *More Mistakes We Make* (1901), ending as follows, "And so it is with many others of the world's fireside tales: the learned, yet cruel, antiquary says they belong to some other country, that they belong to a widespread group of legends, and that by strange and unknown channels, perchance through the mouths of invaders, pilgrims, crusaders, or gipsies, they have found their way into the folk-lore of Europe and far away Iceland, to be transfigured by some

poet or romancer, and eventually to take their place in literature." [Exit Mr. Clark.]

"Parliament is called upon this session to regulate a charity left by the real Dick Whittington, and the Bill for the purpose was issued on Saturday.

"Richard Whittington, a mercer of the City of London, became a sheriff in 1392, was Lord Mayor in 1397, 1398, 1406, and 1419, and in 1416 was elected M.P. for London. He seems to have frequently lent King Henry V. money, and he supplied cloth of gold for the marriage of the King's daughter.

"He died in 1423, and among his many benefactions to London was a charity managed by the Mercers' Company, under trusts confirmed by King Henry VI. on petition to Parliament in 1431.

"The Bill now introduced in the House of Commons is to apply the charity under a scheme approved by the Charity Commissioners. The schedule gives the present gross yearly income as £21,551 16s. 10d., derived from the following among other properties:—

"Gresham Buildings, Basinghall Street.

"The Bell public-house.

"48-9, Coleman Street and 17-20, King's Arms Yard.

"1-4, Tokenhouse Yard Buildings.

"Mercers' Terrace, Highgate.

"Almshouses, Highgate.

"The new scheme provides for the payment of not more than £40 a year to twenty-eight almspeople, poor single women or widows over the age of fifty-five. One-third of the residue of the income of the charity goes in pensions to indigent members (and their families) of the Mercers' Company, and the remaining two-thirds in pensions to deserving and necessitous persons, half of whom must have resided for two years in the Metropolitan Police area. In all cases there is a condition that the recipient must not have received Poor Law relief."—*Daily Mail*, March 29, 1909.

Myths and Anecdotes.

From the *University Correspondent* of October 12, 1895:—

"A learned writer in the *Spectator* is under the misapprehension that the field of school and college myths has yet to be explored, says the *Daily News*—'is entirely untrodden by the scientific investigator.' If this were so, the scientific

investigator would not be worth his salt. Mythology, as Arbuthnot showed long ago, in his epoch-making treatise on Political Lying, pervades every province of human activity. The student must examine the whole discourse of mankind, including Common Room jokes. It is not (as the philologists did falsely boast), it is not the Aryan peoples alone who enjoy the mythopoeic faculty. Savages again, though the earliest, are not the only myth makers; nor are children, though every nursery is the cradle of innumerable myths. All men are mythopoeic, and the great general laws which govern the evolution of Egyptian, or Aryan, or Zulu mythology, are active in college rooms and quadrangles. One of these laws is Economy of Invention. There are but few original stories in the world, and of these (an American professor has remarked) only one can be told to ladies. The nations repeat them, and Quashee, lolling in the sun of Timbuctoo, laughs at the same *facetiæ* as Major-General Sir George Tufto enjoys in his club in Pall Mall.

"A noted instance is a fable about General Jackson; it has been traced to a manuscript of King John's reign, and is probably as old as war. Another myth, current about a modern Scotch citizen, is found in '*Le Moyen de Parvenir*' of Verville, and, generally, all smoking-room stories may be discovered in the French Fabliaux. Exactly the same remark holds good of ghost stories, and one of seemingly recent origin has had its pedigree traced to William of Malmesbury, shortly after the Norman Conquest. Thus the law of Economy of Invention is illustrated, or rather demonstrated. It holds good all round, and the story that is told of Odysseus, or Jason, or Heracles, in Greece, is told of Finnish, Samoyed, Samoan, or Algonquin heroes. The personal name is nothing, the anecdote is everything. All sound thinkers recognise this law in college myths. There is a story of a late Master of Trinity, Cambridge. So Lord Rosebery (himself of Christ Church) attributes it, in a speech, to Mr. Jowett, of Balliol. No new invention is needed; the new hero, simply and naturally, inherits the old myth. The *Spectator* has a story of Mr. Jowett hearing a number of anecdotes about himself, and saying: 'I told all those stories of my predecessor except one, and that is not true.' To take an example, Mr. Jowett told, as of Dr. Scott, this anecdote, first observing that 'it was not true.' A man asked leave to go down, as his aunt was dead, to attend her funeral. 'I could wish, Mr. D., that it

was a nearer relation,' said Dr. Scott. This myth has now become attached to Mr. Jowett's cycle ; in 1865 it was current of Dr. Scott and a Balliol undergraduate who may prefer to remain anonymous.

" It is astonishing that a Balliol myth of 1750 has not, to our knowledge, crystallised round Mr. Jowett. A Balliol man had ineffectually cut his throat. ' Tell him, if he does that again, I will sconce him five shillings at the buttery,' said the Master of 1750, or thereabouts. This was very like the late Master. Only Mr. Jowett could have said to the doubting undergraduate who ' could find no Deity,' ' You'll find him, or you'll go down before Hall.' And it was he who said, of a prominent person, whose simplicity of manner was praised, ' The simplicity of his manner and the duplicity of his mind are the making of him.' Yet the same Master, after a long walk with a hungry undergraduate, remarked, ' We'll send round to Cripps for a cold pigeon pie and a greengage tart, and have a jollification.' Now the man had meant to 'do himself very well ' at the Mitre. So simply ascetic were the manners of the Master while still a tutor.

" It may be observed that most myths about Masters deal with snubs, more or less ingenious. Thus, a man took his papers after Greats to Mr. Henry Smith, who heard him with such urbanity that the youth thought himself sure of a First. ' And how will Brown do, sir ? ' he asked ; now, Brown was his friend. ' Brown,' replied Mr. Smith, sweetly, ' Brown will be ploughed too.' Internal evidence assures us that the story is correctly attributed, but some new don may have inherited it by this time. Colleges have short memories. When Mr. Swinburne appeared, a comet in poetic skies, about 1865, no tradition concerning him survived at Balliol. The oldest scouts remembered nothing, unless it were a difficulty in getting Mr. Swinburne up in time for early chapel, and this could not be called a striking peculiarity. Nobody was ever remembered except ' Blades ' (Mr. Calverley), whose fame is probably immortal. An undergraduate quoted Mr. Swinburne, in a Latin essay, as ' poeta ille noster.' ' Who is he—Milton ? ' asked Mr. T. H. Green, of philosophic reputation. ' Not Milton, sir—Mr. Swinburne,' was the answer ; and Mr. Green only sniffed. Colleges know little of their greatest men, and ' know that little wrong.' As Zeus expelled Cronos, as the saints usurped the holy wells of the fairies, so the new dons appropriate the myths about the old dons, and Dr.

Caird, of Balliol, will soon have his legend—just the ancient Balliol legend, dating from the time when Wiclif was Master, if ever he was Master, which we leave to more accurate research.

"Now here the mythologist falls back on the method of psychical research, finds out the ex-undergraduate, and makes inquiries of him. If he cannot remember, the myth becomes, perhaps, as old as Dervorgilla, who founded the college. To call Mr. Jowett 'Dr. Jowett,' as the *Spectator* does, is to indulge in myth. The Master was not a Doctor. Folk-lore assigns the explanation that he would not sign the Articles. Yet myth adds that, about 1862, being asked by an opponent if he were ready to sign the Articles, he answered: 'Yes, if anyone will lend me a pen.' In each case, as the *Spectator* justly remarks, we must look for original testimony, and examine internal evidence. Where a Master says of a young fellow: 'The time which he can spare from the decoration of his person he devotes to the neglect of his duty,' we may, without hesitation, regard Dr. Thompson, of Trinity, as the speaker. Again, where a don says of the Editor of *Nature*, that he would be thought arrogant even if he were the author of Nature, we recognise Mr. Henry Smith as the speaker, from internal evidence. The myth about Mr. Jowett and the Balliol laundresses (who complained that, as they 'washed for Scotch gentlemen,' their returns were inconsiderable) is probably true, and, in any case, is not older than Dr. Jenkins."

That St. Augustine was the First Person to introduce Christianity into Great Britain

St. Augustine landed in England in 597, but St. Alban had suffered martyrdom on account of his Christian faith nearly three hundred years before that date, and the three British Christian Bishops of London, York, and Caerleon (Wales) attended the Council of Arles in 314.

Constantine the Great (d. 337), who first made the Roman State Christian, is said to have introduced Christianity into Great Britain, and St. Columba (d. 597) converted the Picts in Scotland, his headquaters being in the island of Iona; while Aidan (Bishop of Lindisfarne; d. 651), who also came from Iona, taught Christianity in Northumberland and the North of England.

That St. Augustine was *not* the first is made *quite* clear by Prof. Cyril Ransome, M.A., at p. 13 *et seq.* of the 6th ed.

of his *Short History of England*, and by Prof. S. R. Gardiner in his *Outline of English History*. Prof. T. F. Tout, M.A., in *A Short Analysis of English History*, p. 6, says: "The Welsh remained Christians from Roman times."

Lastly, we may refer the reader to Vol. I. of *Illustrated Notes on English Church History*, by the Rev. C. Arthur Lane, F.R.Hist.S., where the subject is dealt with fully.

That the Correct Name of the Heroine of Orleans was Joan of Arc, or Jeanne d'Arc

The correct forms are Joan Darc, or Jeanne Darc, and in support of this we find that Prof. S. R. Gardiner says: "Joan Darc, known usually in England, by a curious mistake, as Joan of Arc." The mistake is in supposing that the French form is d'Arc, instead of Darc (the d' meaning "of"). Prof. Cyril Ransome, M.A., uses the form Jeanne Darc. Henri Martin, in his *Histoire de France*, adopts the spelling *Darc*, instead of *d'Arc*, on the grounds that there is no such village as Arc near Domrémy (where the heroine was born), and consequently there is no sense in "Joan of Arc."

". . . . the French antiquaries seem now to be agreed that it was Darc, and not D'Arc . . . . Hence the name Joan of Arc, by which she is popularly known in England, is a mere mistake . . . . during her lifetime, she was usually spoken of as La Pucelle, or The Maid; . . . ." —*Book of Days*, Vol. II., p. 77.

Others who have gone into this point are M. A. Vallet de Viriville and M. P. G. Dumast, both of whom adopt the form Jeanne Darc.

Mr. C. E. Clark, at p. 31 of his *More Mistakes We Make* (1901), has much to say about "a whole literature of doubts and rejections," and states, "she was but one of a score or more women who carried consecrated banners at an archer's pay per diem."

That Ethelred the Unready means Ethelred the Unprepared

The meaning of the word "unready" in this connection is "without counsel," and it should be spelled "unrede." Dr. Brewer and Prof. Cyril Ransome, M.A. (p. 29), both give this meaning to the word.

That Wellington said, "Up, Guards, and at them!" at the Battle of Waterloo

Dr. Brewer (*Phrase and Fable*) is pathetic on this point, and we feel sympathetic too, but as this book is for the purpose of correcting misapprehensions, we must carry out this object "without fear or favour."

Profs. Gardiner and Ransome, Wood's *Dictionary of Quotations*, and Maunder's *Treasury of History* do not mention the incident, while under "Up" (p. 1262), Dr. Brewer says, "It has been utterly denied by recent writers, but it is the fashion to deny or discredit all cherished traditions. [The author is blushing crimson!!] I, for one, wish the tradition were true, because, like Nelson's motto at Trafalgar, it gives a memorable interest to the charge; but, alas! we are informed that it was not the Guards, but the 52nd Light Infantry which broke the column of the French Imperial Guard in the final charge; and 'honour to whom honour is due.'"

Once realise it was not the Guards, and the whole thing becomes obvious. No one would argue that the Duke could have been ungrammatical, even in trying circumstances; hence to have used such a sentence at all he must have said to a *foot* regiment, "Up, feet, and at them!"—"which is absurd," as Euclid used to say!

In connection with the disbanding of a battalion of the Scots Guards, the *Daily Telegraph* of July 30, 1906, had a leading article, from which we quote the following: "They were at Waterloo when, at the crowning moment of that battle, the Iron Duke's voice was heard, firm and clear through the tumult, not with the theatrical 'Up, Guards, and at 'em!' but with the sterner and steadier command, 'Stand up, Guards!'"

Mr. C. E. Clark (*More Mistakes We Make*, p. 82), says, ". . . . The Duke's biographers are as numerous as his victories. They need not be mentioned, as all are overtopped this moment by Sir Herbert Maxwell's *The Life of Wellington*."

Then he quotes from Vol. II., p. 82:—

"They reached the crest as a single column, containing the First and Second Battalions of the 3rd Chasseurs. There was nothing in their front, apparently, and they had neared the cross-road, when Wellington's voice was heard clear above the storm, 'Stand up, Guards!' Then from the shelter of the wayside bank rose the line of Maitland's brigade."

To which there is this footnote: "This is the origin of the theatrical 'Up, Guards, and at 'em.' The Guards were lying down, as it was the Duke's orders all troops should do under fire, when not actually engaged (Croker, III., 281).

See also *Notes and Queries*, 9 S V., 32.

R. L. Stevenson in a letter, dated Jan., 1885, to Sir Sidney Colvin, wrote, "Dear man, to the breach! Up, soldier of the iron dook, up, Slades, and at 'em! (which, conclusively, he did not say: the at 'em-ic theory is to be dismissed)."

That Wellington said, "The Battle of Waterloo was won on the Playing Fields of Eton"

Dr. T. Miller Maguire, the army coach, lectured on "Military Education in England" at the Royal United Services Institution on July 4, 1902, in the course of which he said: "We are often told that 'the battle of Waterloo was won on the playing fields of Eton.' Wellington never said anything of the kind, and he (Dr. Maguire) was certain that if the Duke had said it he would have been telling a lie. Yet it was used as a text by pedants for neglecting any kind of mental instruction whatever. Wellington himself never went to a playing school, nor have twenty of the most eminent officers in the British Army to-day. The place to learn how to win battles was the study, and not the playing ground."

H. G. Wells has written somewhere:—

"The battle of Mons—when the British Army, in the wrong place and the wrong quantity, and without sufficient machine guns and aeroplanes, covered itself with glory in a losing fight—was lost upon the playing fields of Eton."

At p. 493 of Vol. XXIV. of *Ency. Brit.* we find, "We have his own testimony that it was during these years of obscurity [in India] that he qualified himself in one direction for the great military career before him. As Colonel commanding a regiment he gained the most minute and accurate acquaintance with every detail of the soldier's life . . . . It was to this absolutely complete knowledge of practical details that Wellington ascribed in great part his own success in the highest commands. It is probable, moreover, that he at this time made a serious study of the science and history of warfare."

Hence we see his success is to be ascribed to his complete theoretical and practical knowledge of his profession, and may

dismiss the "playing fields" story as a dangerous and ingenious excuse for avoiding hard work, cleverly invented probably by an enthusiastic captain of the school's first eleven!

That King Charles I. of England was the Author of "Eikon Basilike" (The Royal Likeness)

Prof. Ransome says the book professed to have been written by King Charles. It gave an account of his life and meditations in prison, and produced such a reaction in his favour that Milton was engaged to answer it. Dr. Brewer says that John Gauden, Bishop of Exeter, claimed to be the author in a letter he wrote to the Lord Chancellor, in which he said:—"The *Eikon* is wholly and only my invention," *i.e.*, except the prayer put into Charles's lips the night before execution, which Gauden transported bodily from Sidney's *Arcadia*, and which by "popular fallacy" was long ascribed to the Royal master by his admirers. *Pannell's Reference Book* states that Dr. Gauden was almost certainly the author, while Haydn's *Dic. of Biog.*, under "Gauden," says that Gauden published the book a few days af ter the execution of King Charles, and that while the authorship was attributed to the King by South, Wordsworth, and others, Mackintosh, Lingard, Hallam, and Macaulay considered Dr. John Gauden to have been the author.

That William Tell shot an Apple off his Son's Head with a Bow and Arrow

"The canton of Schuyz, in August, 1890, ordered the story of Tell to be expunged (as being non-historical and legendary only) from the school books of the canton."—*Echo*, May 23, 1893.

The legend, which is fairly fully dealt with in the *Cent. Cyclo. of Names*, is common to several countries, though it is best known as applying to Switzerland. In England it is fathered on to William of Cloudesley, and is said to have been once common Germanic property.

The stone in the Washington monument in America, contributed by the Government of Switzerland, bears the inscription: "This block is from the original chapel built to William Tell, in 1338, on Lake Lucerne, Switzerland, at

the spot where he escaped from Gessler." Since the stone was presented to the United States, the Historical Society of Switzerland has demonstrated that no such persons as Tell and Gessler ever existed!

That King John of England signed Magna Carta

The fact is the "Charter of English Liberty" was not *signed* by John, but the seal was probably put on in the Chancery, which could say of most charters: "The King touched the parchment, and we did the rest."

It is even doubtful whether John could write, for no writing or signature of his has come down to us. In the Royal Exchange, London, there is a fresco painted by Ernest Normand, presented by one "who was anxious to correct a very common error." It represents King John and the Barons, and shows the Royal seal being affixed by a man with a press for the purpose. Alas, the author of *Popular Fallacies* must attempt to assist the correction in a less expensive manner! We regret to note the title under the fresco is wrongly given as "Magna Charta." In Latin it is Magna Carta; and in English, The Great Charter.—*Notes and Queries*, Sept. 17, p. 234, and Oct. 22, p. 338, 1921.

That King Edward VI. of England was a Great Founder of Schools

The cause of this fallacy being popular is probably due to the fact that the historian, J. R. Green, author of *A Short History of the English People*, supports the popular view. The balance of evidence is undoubtedly against the popular idea. As authorities we may name Mr. Arthur F. Leach's *English Schools of the Reformation*. Edward VI.—he reigned only six years, and was only 16 when he died—was not only not a founder of schools, but a great destroyer of them, some 300 being suppressed under him and his father, Henry VIII. Another cause of the popularity of this fallacy is the fact that Edward VI. did found at least one very successful and celebrated school, viz. the Blue Coat School or Christ's Hospital, which was in Newgate Street, London, until 1902, when it was removed to Horsham, Sussex. Prof. John Adams, M. A. (Prof. of Education at the University of London), is another authority who opposes the popular idea; and Miss L. P. Steele-Hutton, M.A., wrote, "Edward VI.

is generally regarded as a benefactor to education by the founding of grammar schools. The evidence is all the other way! He put an end to more than he founded, and some of those which bear his name were far older establishments which he permitted to continue. The little work which I have done in one county on this subject amply bears out what Mr. Arthur F. Leach says, speaking generally, of England."

Prof. Ransome says nothing about Edward VI. having founded schools, while Prof. S. R. Gardiner says: "Latimer, a bold preacher (Protestant), told the lords . . . that they ought to make restitution to the poor . . . In many towns *the merchants and shopkeepers* gave money to found schools which should be open freely to the poor."

That St. Peter was Bishop of Rome for 25 Years

Miss Steele-Hutton, M.A., has kindly dealt with this fallacy as follows:—

"There is no positive evidence against the common belief, but painfully little of an authentic nature to support it. *Acts* and *Galatians* (written when Peter was at Antioch) and I. *Corinthians* IX., 5, are all the biblical references to him outside the Gospels.

"About the end of the first century, Clement of Rome says St. Peter was martyred, but no place is stated.

"During the second century, in the 'Preaching of Peter,' he and St. Paul are represented as being at Rome.

"Ignatius, in the Epistle to the Romans, says:—'I teach you not as did Peter and Paul; they were Apostles.'

"In A.D. 171, Dionysius of Corinth said:—'Peter and Paul planted together the Church of Corinth, and suffered martyrdom in Italy about the same time.' (N.B.—No evidence of this Corinthian foundation exists.)

"Irenæus said:—'Peter and Paul founded the Church of Rome.'

"In the third century, Tertullian said:—'Peter at Rome suffered a death like Christ.'

"In A.D. 228, Origen wrote:—'Peter was crucified head downwards.'

"In the fourth century, Lactantius stated:—'Peter and Paul preached at Rome. Nero crucified Peter' ('Of the Manner in which the Persecutors Died,' Chapter II., Ante-Nicene Library, Vol. XXII.);

" ' that tradition derived from the Apostles, of the very great, the very ancient, and universally known Church founded and organised at Rome by the two most glorious apostles, Peter and Paul.'—Irenæus, *Against Heresies*, Book III., Chap. III., § 2.

" For criticism of this see *History of Christian Literature and Dogma*, Vol. I., Chap. II.—Dr. James Donaldson.

" The same authority, speaking of Clement of Rome, says :—' With regard to Peter, he states that he endured several troubles on account of jealousy, and that having borne his testimony he went to the due place of glory. It is questionable whether he asserts that Peter and Paul were martyred at all. It cannot be proved that μαρτυρέω (" to bear witness ") had acquired this meaning yet.'

" *Ante-Nicene Christian Library*, Vol. IX. p. 155 (' Fragments of Caius preserved in Eusebius,' ' Eccles. Hist.,' II., 25) : ' And I can show the trophies of the Apostles. For if you choose to go to the Vatican, or to the Ostian Road, you will find the trophies of those who founded this church.'

" A footnote says :—' The reference is to the Vatican as the traditional burial-place of Peter, and to the Ostian Road as that of Paul.'

" In the fourth and fifth centuries, Jerome said Peter was for twenty-five years Bishop of Rome. Jerome translated the Bible into Latin—the Vulgate edition—and his word went for much, especially when the idea was so satisfactory. Hence the statement ' *Non videbis annos Petri* ' made to each Pope at his installation, which partly accounts for the continuance of the fallacy."

Maunder (*Treasury of History*) does not refer to the matter. *Haydn's Dict. of Biog.* says : ". . . said to have been crucified at Rome June 29, 65 or 67." *Cyclo. Names*, ". . . according to tradition was the founder of the church at Rome and a martyr there in the reign of Nero." *Harms. Ency.*, ". . . he spent his last years in Rome, being martyred there *c.* A.D. 64."

Mr. Walter May, in his paper on *The Papacy*, read before the Casual Club, on Apr. 7, 1910, said, " There is no shadow of foundation in history for the statement that St. Peter was ever sole Diocesan Bishop of Rome, although his residence there for some time can be proved. . . There is, however, nothing to point to St. Peter exercising authority over the church in the Eternal City by himself."

"During the latter [the persecution of the church by Herod] Peter was put into prison (*Acts* XII., 3 *sqq.*), but was released by an angel; he first went to the house of Mary, the mother of John Mark, and afterwards went to 'another place.' This expression has been interpreted to mean another town, and even to be an implied reference to Rome. This last suggestion, improbable though it be, is historically important. The persecution of Herod seems to have been in his last year, which was probably A.D. 43-44. There was a marked tendency to make the duration of Peter's episcopate at Rome twenty-five years; and a combination of this tendency with the explanation that the ἕτερος τοπος was Rome probably is the origin of the traditional dating of the martyrdom of Peter in A.D. 67-68. There is, however, no justification for this view, and ἕτερος τόπις need not mean more than another house in Jerusalem."—*Ency. Brit.*, 11th ed., Vol. XXI., p. 287.

That Julius Cæsar was an Emperor of Rome

Julius Cæsar was born on July 12th either in 100 B.C. or 102 B.C., and he was assassinated on March 15, 44 B.C. He was a famous Roman general, statesman, orator and writer, his best known existing work being his account of the Gallic wars. His powers and genius were simply astonishing, and Napoleon seems to be his only rival to the first place in the history of the world. He was Consul five times and Dictator four times, but never Emperor, though this might have been had he not been murdered by Brutus and his friends. The all-sufficient proof that he was never Emperor is the fact that the *Empire* of Rome was not founded till 27 B.C., *i.e.*, 17 years after his death, Augustus being the first Emperor. In Julius Cæsar's time, and for several centuries before, Rome was a Republic. The mistake may have arisen in this manner (*Cham. Ency.*): he was the first to "arrogate to himself" the title of "imperator," and made the title *precede* his name, thereby signifying that he was *the* Emperor, whereas formerly the title followed the name, and implied merely that its possessor was *an* imperator. The *Cent. Dic.*, on the other hand, states that this title was "first assumed (with the consent of the Senate)."

Even *Ency. Brit.*, IV., 638, is in error in this matter (!), but in a comparative long article in *Smith's Smaller Classical Dic.* (1913), edited by E. H. Blakeney, M.A., there is no mention of Cæsar ever being Emperor.

Even Shakespeare did not fall into this popular error, for we find (Julius Cæsar, I. ii., 220) :—

" Why, there was a crown offered him : and being offered him, he put it by with the back of his hand, thus : and then the people fell a-shouting. . . . . .

" Was the crown offered him thrice ?

" Ay, marry, was't and he put it by thrice, every time gentler than other."

Bacon, in his *Advancement of Learning*, p. 80, has, " The second speech was thus : Cæsar did extremely affect the name of king ; and some were set on, as he passed by, in popular acclamation to salute him king ; whereupon, finding the cry weak and poor, he put it off thus, in a kind of jest, as if they had mistaken his surname ; *Non Rex Sum, sed Cæsar* ; a speech that if it be searched, the life and fulness of it can scarce be expressed."

The *Harms. Ency.* speaks of him as " the great dictator," but nowhere as " Emperor," and in a long article says, " He was ashamed of being bald, and valued highly the privilege accorded him of wearing a laurel wreath, which concealed his lack of hair." Now, had he been Emperor, presumably it would not have been necessary for such a privilege to have been accorded to him—he would have taken it.

That Flora Macdonald was a Poor Wandering Lassie

She will be remembered as the Scotch heroine who assisted " Prince Charlie " to escape to and from Skye after the battle of Culloden Moor. The manner in which her assistance was rendered should at once make it apparent that she was *not* in poor circumstances, for she dressed Prince Charles Edward up as an Irish spinning-maid, " Betty Burke," and took a man-servant with her as well. A *poor* lassie with a man-servant and maid would have attracted attention and led to discovery. This incident which has made her famous occurred in 1746, and, according to Miss Steele-Hutton, Flora Macdonald was only about thirty-six hours with Prince Charlie, but she saved his life and made her mark in history in that brief time. She was born in 1722, married in 1750, went to North Carolina in 1774, returned to Scotland in 1779, and died in 1790.

She was a daughter of Ronald Macdonald, farmer (tacksman), of Milton, in South Uist, was educated by a private governess, and at a boarding school in Edinburgh. On June 27, 1746, at 10 a.m., Flora, Prince Charlie, and the man-

servant set sail over the Little Minch to Skye, and spent the night in her relative's house at Monkstadt. Next day they went to Portree (between twenty and thirty miles), when the Prince took boat to the mainland and they parted.

The author saw at 10, Chester Street, London, S.W., on Feb. 4, 1912, a half-length oil painting, about full size, by Allan Ramsay, showing Flora in a white satin and blue low-neck dress, and in which she looked anything but a "puire wee lassie"!

Her husband became a brigadier-general in the British Army.

"Fate has sported curiously with Flora's memory, and perhaps there are few people of like fame concerning whom such glaring errors prevail. For instance, she is often represented as belonging to a bigoted Jacobite family; while equally far from the truth is the idea, frequently mooted, that she was an uneducated country lass."—W. G. Blaikie Murdoch in *T.P.*'s *Weekly*, May 23, 1913.

That Christ was born in the Year 1 A.D.

We use the symbols B.C. to indicate the years before the birth of Christ, and A.D. to indicate those after his birth. Hence it is natural and rational to suppose, as did Dionysius Exiguus in the sixth century, that Christ was born on Dec. 25, of the year 1 A.D.; but more careful examination of chronology has led to the conclusion that Christ was born in the time of Augustus, the first Roman Emperor, 4 B.C.. So that the error is due to Dionysius.

Archdeacon Farrar (*Life of Christ*, p. 14) says, ". . . the birth of Christ took place three or four years before our received era."

It is interesting to note that astronomers call the year before 1 A.D. the year 0, and the year before that they call 1 B.C., an undoubtedly more scientific method. Hence, by their system (and if no mistake had been made by Dionysius) the date of the birth of Christ would be given as December 25 of the year 0.

That the Art of Printing was first practised in England in 1474, and that the First Book printed in England was "The Game and Playe of Chesse"

We believe we should not be far wrong in saying that many think that Caxton *invented* printing. This, too would be a popular fallacy.

The Game and Playe of Chesse was translated by Caxton from the French, and he had it printed in 1475, probably by Colard Mansion in Bruges, for Caxton did not leave Bruges (where he learnt the art of printing) till 1476. He then returned to England and *published The Game and Playe of Chesse.* It was not till 1476 that Caxton set up his printing press in Westminster, so, obviously, the above-named book could not have been printed there. This book was not even the first (but the second) printed in the English language, for that was Caxton's translation of *Recueil des Histoires de Troye,* which he completed in 1471, and which was published in 1474.*

The first book printed by Caxton in England was his *Dictes or Sayengis of the Philosophres,* which appeared in 1477. Prof. T. F. Tout, M.A. (p. 61, *Analysis of English History*), says :—" 1477, William Caxton introduced printing into England " ; and Haydn's *Dic. of Dates* and the *Cyclo. of Names* confirm the account here given.

In conclusion, we will give the following quotation from Dr. Brewer's *Phrase and Fable* :—

" It is a mistake to suppose that Caxton was the first printer in England. A book has been accidentally discovered with the date 1478 (Oxford). The Rev. T. Wilson says : ' The Press at Oxford existed ten years before there was any press in Europe, except those at Haarlem and Mentz. The person who set up the Oxford Press was Corsellis.' "

The name Corsellis is not given in the *Cyclo. of Names.*

That Henry of Monmouth, the ' Madcap ' Son of Henry IV. of England, was sent to Prison by Judge Gascoigne, and that afterwards when Prince Henry became Henry V. he praised Gascoigne for his Action

" Sir, here comes the nobleman that committed the Prince for striking him about Bardolf."—Henry V. (2), I., ii., 54.

" For the box of the ear that the prince gave you, he gave it like a rude prince, and you took it like a sensible lord."—Ibid I., ii., 190.

Maunder, in his *Treasury of History,* gives the popular version ; but Prof. Cyril Ransome, M.A., does not mention either incident, while Prof. S. R. Gardiner says :—" No real evidence in support of the story, though not altogether without foundation."

* Copies of these books may be seen in the John Rylands Library, Manchester.

Mr. C. E. Clark is very decided about the story being untrue, saying, indeed, that the tale did not appear till 150 years after the alleged incident. The *Cyclo. of Names* throws considerable doubt on the story, for under "Gascoigne" it says, "According to tradition he committed Prince Henry to prison"; while under "Henry V." it says, "He is said on doubtful authority to have been wild and dissolute in his youth." The Plea Rolls contain no record of the committal. The fallacy is completely disposed of in the *Trans. Roy. Hist. Soc.*, New Series III., p. 47, and in the *Dic. Nat. Biog.*, Vol. XXI., p. 46 from which we quote the following:—

"With the story of his committing Prince Henry to prison, and of that prince's magnanimous behaviour towards him on his accession to the throne, it fares still worse. For the committal there is no evidence; the latter part of the story is demonstrably untrue. The committal to gaol for contempt of the heir-apparent to the crown would have been an event of such dramatic interest as could not fail, if it occurred, to have been recorded by some contemporary writer, and duly noted as a precedent by the lawyers. In fact, however, no contemporary authority, lay or legal, knows anything of such an occurrence, the earliest account of it being found in Sir Thomas Elyot's 'Governour' (1531), a work designed for the instruction and edification of princes, and in particular of Henry VIII., of no historical pretensions, but abounding in anecdotes drawn from various sources, introduced as illustrations of ethical and political maxims. (An exhaustive discussion of the question will be found in a paper by Mr. F. Solly Flood, Q.C., in the *Royal Hist. Soc. Transactions*, New Ser. III., Pt. I.) From Elyot's 'Governour' the story passed into *Hall's Chronicle* with the material additions:—(1) that the contempt in question consisted in the prince's striking the chief justice a blow on the face with his fist; (2) that the King, so far from resenting Gascoigne's conduct, dismissed the prince from the Privy Council and banished him the court (Hall, *Henry V., ad init.*)."

Sir William Gascoigne.—" . . . . Nine days after the death of Henry IV. a successor was appointed to his office, which disposes of the fiction that Henry V. continued him in it (Shakespeare's *Henry IV.*, V. ii., 102-121). The famous story of his encounter with the dissolute young prince Hal lacks historical support. Mr. Croft and Mr. Solly Flood

believe it originated in the Rolls entry under Edward I., that the prince, afterwards Edward II., was expelled from the court for half a year for insulting one of his father's ministers."—*Chamb. Ency.*

That the Duke of Clarence (Brother of Edward IV. of England) was put to Death by being drowned in a Butt of Malmsey Wine

Mr. C. E. Clark, while agreeing that the Duke was made away with in the Tower of London, says there is absolutely no evidence to support the popular story. Profs. Ransome and Tout do not mention the wine incident. Maunder gives it in full detail. Prof. S. R. Gardiner says no one really knows how he was killed. The *Cyclo. of Names* says, under "Plantagenet, George, Duke of Clarence":—"According to an unauthenticated tradition, he was drowned in a butt of Malmsey wine," and *Dic. of English Hist.*:—"George, Duke of Clarence (*b.* 1449, *d.* 1478), condemned to death in 1478, was made away with secretly in the Tower. According to a well-known story, which is not supported by authentic evidence, he was drowned in a butt of Malmsey wine."

Prof. Cyril Ransome (*A Short History of England*, p. 162) says, "In 1478 Edward took an opportunity to execute his brother Clarence. . . ."

That Jane Shore, Mistress of Edward IV. of England, died in Poverty and in a Ditch, thus giving the Name Shoreditch to a Borough of London

On this point the *Cyclo. of Names* remarks:—"The agonising details of her death in a ditch from starvation are without authority, though the old ballad gives them with great precision."

The ballad (written in the seventeenth century, while Jane Shore died in 1527) has:—

> "I yielded up my vital strength
> Within a ditch of loathsome scent,
> Where carrion dogs did much frequent."

Another argument against the fallacy is the fact that after Edward IV.'s death she was taken care of by Lord Hastings, and some time after he was beheaded she was cared for by the Marquis of Dorset. Thus we see she had

several "friends at Court," which, being a considerable commercial asset, was not likely to lead to the death alleged.

Dr. Brewer does not support the popular version.

That Savonarola was a Protestant Reformer

He was a reformer, being chiefly known for bringing about a religious revival by his denunciation of the vice and corruption prevalent both in the Roman Church and in the State (Italy). He was born in Italy on Sept. 21, 1452, and was strangled and then burned at Florence on May 23, 1498, at the instance of Pope Alexander VI., whom he had denounced. His own writings clearly show he never wavered in his adherence to the Church of Rome, and, consequently, he could not have been a Protestant Reformer. Mr. W. R. Wallace, in his paper on Savonarola to the Casual Club, on Feb. 13, 1908, made this fact clear, and pointed out that *Romola*, by George Eliot, is really a history of Savonarola.

That the Pilgrim Fathers emigrated direct from England to North America

Maunder and Gardiner give no information on the point, but Prof. Cyril Ransome says :—" In 1608 a body of Nottinghamshire Independents left England, and settled at the town of Leyden in Holland. After a time they thought they should prefer a country life, and in 1620 they sailed from England to America in the *Mayflower*." Thus the long period of twelve years intervened between their leaving England and arrival in America, for, according to Mr. C. E. Clark, they only called for friends at Southampton on their way from Holland to America.

An article by Mr. J. A. T. Lloyd on " The Voyage of the *Mayflower* " appeared at pp. 821-2 of *T.P.'s Weekly*, of Dec. 17, 1909, from which we abstract the following :—" The *Speedwell* left Holland in 1620 with the future founders of New England on board. . . The first destination of the *Speedwell* was Southampton, where they were joined by English friends and recruits on the *Mayflower*, which was to be the second boat of the expedition. ' In a fortnight,' writes William Deverell, ' the *Mayflower* and the *Speedwell* drop down Southampton Water—with less fanfaronade but greater import than the armaments of our Edwards and our Henrys bound for the shores of France—and soon reach the high seas ;

but they put back for repairs into the port of Dartmouth, where they were detained for another fortnight.' Once more they set sail, but again, when ' a hundred leagues from Land's End,' they are forced back through the leakiness of the *Speedwell* and the timidity of her captain. This time they returned to Plymouth, where the *Speedwell* is discharged and Robert Cushman and a few others are left behind. On Sept. 16, 1620, the *Mayflower* sailed alone on a voyage whose destination was the shores of the Hudson."

The party consisted of 102 Nonconformists, 28 being women.

That Horatius defended the Sublician Bridge over the Tiber with the Aid of Two Friends

'Tis indeed sad to see all these pretty stories picked to pieces, and the author—though he doubts whether his readers will believe him !—is really dropping a tear over this one, for in his childhood he had a great love for anything Roman. Roman history, a Roman wall or road, would thrill him with admiration for that wonderful people, concerning whom his father taught him much. This being so, it can be easily understood how fascinated he was by Macaulay's poem on the defence of the bridge by " Brave Horatius." To learn now that his other name was Cocles, meaning " one-eyed," is alone enough to knock all romance out of the story which Maunder states briefly and without contradicting it. The *Cyclo. of Names* speaks of him as a Roman *legendary* hero, Mr. C. E. Clark is decidedly of opinion that the subject matter of the story is a myth.

" There can be little doubt that among those parts of early Roman history which had a poetical origin was the *legend* of Horatius Cocles."—*Internat. Lib. of Famous Literature*, I., p. 438.

H. R. Allport at p. 39 of his Macaulay (1917) says, " The story of *Horatius* raises in acute form the old question as to the limits of poetic license. Can we be fairly asked to believe that the Romans, after ample warning, would make no preparation whatever to defend their city till the enemy was within two miles, or that a vast army, burning for revenge and plunder, would permit itself to be kept at bay by three men who could have been destroyed in a moment by a few darts or arrows ? The other lays are more happily constructed."

That Scævola entered the Camp of Porsena and held his own Right Hand in a Fire until it was burnt off

Alas! another Roman anecdote of heroism is dashed to the ground. Dr. Brewer gives the usual story, and its origin seems to be accounted for by the fact that the meaning of the Latin word *Scævola* is "left-handed." The *Cyclo. of Names* gives the tale as a legend.

That the Black Prince was knighted on the Field of Crécy

Prof. Oman makes the mistake of thinking the Prince was so knighted, in his *School History*, p. 187 and 188; but Dr. McKinnon (*Hist. of Edward III.*, p. 287) gives the correct version, which is that the Prince fought in a skirmish that took place immediately after his landing at La Hogue, and he was then knighted by his father. The origin of the fallacy is probably due to Edward III.'s alleged remark about his son (the Black Prince) when someone asked for aid to be sent to the Prince. "No," said the King, "let the boy win his spurs." Profs. Gardiner and Ransome say nothing about the Prince being knighted on the field.

That Fair Rosamond was offered by Queen Eleanor (Wife of Henry II. of England) a Dagger or a Bowl of Poison as a Choice of a Means of Death

Rosamond Clifford, better known as Fair Rosamond, died peaceably at Godstow Nunnery, near Oxford, about 1176. One most convincing argument that Queen Eleanor did not stab or poison her, is the fact that Queen Eleanor was put into prison (by her husband for intriguing against him) in 1173, and she remained there till Henry's death in 1189. If the poison were given before the Queen went into retirement, then it must have taken a very long time to act! Haydn's *Dic. of Dates* supports the fallacy by saying that Rosamond died "by poison given to her by Queen Eleanor at Woodstock in 1177"; while Mrs. Roe (p. 76, *Sketches from English History*) points out the fallacy, though she falls into others, namely, that William Longsword, and Geoffrey, Archbishop of York, were sons of Rosamond, which they were not.

Rosamond's Bower is also a myth, as is stated by the *Cyclo. of Names*, which also points out the error in connection with Longsword and Geoffrey. Strangely

enough, while Maunder makes the mistake regarding this parentage question, he is definite on the other point, as the following quotation from Chap. XX. shows :—" Of all that romance, whether in its own guise or in that of history, has said of this lady, nothing seems to be true save that she was both fair and frail. Her bower at Woodstock, and the pleasant choice offered to her, by the jealous Queen Eleanor, between the dagger and the poisoned chalice, are mere inventions."

Mr. C. E. Clark, at p. 180 of his *Mistakes We Make* (1897), also states there is no truth in the popular legend that the king built a labyrinth in which to conceal his mistress. " The fact is that Henry, instead of concealing her, publicly acknowledged her. Indeed it would have been quite an extraordinary exception to the State and Church practices of those days to have done otherwise."

That the S.S. *Sirius* and *Great Western* were (in 1838) the First Steamers to cross the Atlantic entirely by Steam power

Mr. J. W. C. Haldane, M.I.M.E., in his *Life as an Engineer*, p. 276, thus deals with the above fallacy :—

" It is believed by most people that the *Sirius* and *Great Western* were, in 1838, the first steamers to successfully cross the Atlantic ; this, however, is a fallacy. In the year 1831, aided by a Government offer of 12,000 dollars, the ' Quebec and Halifax Steam Navigation Company ' was formed, having amongst its list of shareholders the names of Samuel, Henry, and Joseph Cunard. So much prosperity had attended their vessels, that designs had been prepared for the ' largest and swiftest vessel afloat,' which was at once begun, and eventually launched on April 27, 1831, under the name of the *Royal William*, her engines of 200 nominal horse-power having in the meantime been constructed by MM. Bennett and Henderson, of Montreal. . . . After successfully running locally for some time, it was decided to send the *Royal William* to England, and she accordingly sailed from Quebec on August 5, 1833, arriving at Picton, Nova Scotia, on the 8th. From this port she sailed on the 18th for London, where she arrived after a passage of nineteen days, including two days' detention at sea. . . . (p. 278). The *Sirius* and *Great Western*, in

1838, made their famous passages from Cork and Bristol to New York in eighteen and fifteen days respectively."*

Robert Craik McLean, Editor of the *Western Architect*, writing from Minneapolis, U.S.A., on Oct. 25, 1909, to the Editor of the *Jour. Roy. Soc. of Arts* (p. 1025 of the issue of Nov. 12, 1909), said, " Frequent articles have appeared of late, generally in connection with the Fulton Celebration in this country, like that by H. T. W. on ' Early Steam Navigation,' in your *Journal* of Oct. 15, which either do not mention the name of the first steamer to cross the Atlantic Ocean or give the credit to the *Savannah* (which only steamed four days of the entire trip). In the Historical Museum at Chicago is a model of the first steamship like those of the present, not an auxiliary steam and sail boat, that crossed the ocean—the *Royal William*. This steamship was built in the forties at Quebec, Canada, went to London under her own steam, having no other means of propulsion, and afterwards was sold to the Spanish Government.

" The designer is unknown to the writer, but James Goudie, an articled shipwright of Greenock, was sent to Quebec to superintend her construction. Mr. Goudie left the model which he constructed, and the plans and description of her construction, to the Chicago Historical Museum where the data are accessible. So, after all, England can claim the construction of the first steamship to cross the ocean."

To this letter the Editor of the *Jour. R.S.A.* added the following note :—

" The first ship to cross the Atlantic by the aid of steam was the *Savannah* in 1819. She started from the town of that name in Georgia on April 27, and arrived at Liverpool on June 20. Her engines were used on 18 days. In 1838 the *Sirius* and the *Great Western* crossed the Atlantic simultaneously under steam alone. The former started from Cork on April 4, and the latter from Liverpool on the 8th of that month. They arrived at New York on April 23rd."

The following paragraph, dealing with the invention of the steamboat, appeared on p. 212 of the *Scientific American* of Sept. 25, 1909 :—

" The forthcoming festivities commemorate the first complete exploration of the Hudson River by Henry Hudson and the inauguration by Robert Fulton of successful commercial

* As will be seen farther on, the editor of the *Jour. Roy. Soc. of Arts* makes the *Great Western* leave Liverpool.

steamboat navigation on its waters. Hudson was not the first navigatior to see the Hudson River, and neither Robert Fulton himself nor the Commission which has organised and carried through the celebration has ever claimed that Fulton was the original inventor of the steamboat. It is rarely that a complete invention leaps full-fledged from the brain of any one man. Almost invariably it is the product of the disconnected labours of separate individuals, each of whom contributes his quota to the ultimate result. Three men above all others—Symington on the Forth and Clyde Canal, Fitch on the Delaware, and Fulton on the Hudson River—will be for ever associated with the invention of the steamboat ; and it is because Robert Fulton combined with his fine engineering sense a large executive and commercial instinct, and was backed by the financial and political influence of Chancellor Livingston, that he was able, not only to put a practical steamship afloat on the Hudson River, but to establish the infant enterprise as a permanent commercial success."

Ency. Brit., Vol. XXII., says, "The first practicable steamboat was the tug *Charlotte Dundas*, built by William Symington and tried in the Forth and Clyde Canal in 1802."

The following letters appeared in the *Daily Mail* of Oct. 5 and 11, 1909, respectively :—

"Sir,—It is not generally known that Jonathan Hulls, an Englishman, was the inventor of the steamboat in 1736, and to those in doubt upon the subject I would refer them to an article in the *Quarterly Review*, Vol. 19, 1818, which does not speak of Robert Fulton's inventive genius in very flattering terms, but as 'a person of very slender abilities, yet possessed of sufficient shrewdness to avail himself of the invention of another.' I would also refer them to Jonatham Hulls' specification (556), 1736, and his treatise of 1737. The article in the *Quarterly Review* will no doubt prove interesting reading to the supporters of Fulton, Symington, etc.

"It would, therefore, be worth knowing what our American cousins are celebrating in Fulton's name—the more so as steamboats were afloat in America in 1786.

"J. Hooper Hulls.

"149, Browning Road, Manor Park, Essex."

"Sir,—Mr. Robert Stevenson is quite wrong in his statement.

"Robert Fulton, the second son of James Fulton and the

younger brother of Richard Fulton, grandfather of Sir Forrest Fulton, K.C., was born at Little Britain, Lancaster County, Pennsylvania, U.S.A., in 1765, and was of Irish descent. He came to England in 1786, went to France in 1796, and returned to England in 1803, on the invitation of the British Ministry, through Lord Stanhope, for the purpose of working on submarine vessels, including torpedoes.

" E. Raymond Fulton
" (Great-grandson of Robert Fulton).
" 53A, City Road, E.C."

The *Graphic* of Sept. 24, 1910, p. 482, reviewed *Steamships and their Story*, by E. K. Chatterton, and *Steamships and their Story* by R. A. Fletcher, and after referring to the *Savannah* and *Royal William* crossing the Atlantic by steam (" aided largely by sails ") stated that :—

" Arising out of that attempt the suggestion came to attempt the journey entirely under steam, and a company was formed to build a ship and inaugurate a regular traffic between Bristol and Boston. A ship named *British Queen* was begun, but before she was ready it came out that a rival company was secretly at work, and had a steamship about to start and capture the trade. In desperation the *British Queen* Co. hired an Irish steam packet named the *Sirius*, of 703 tons, and hurried her off just three days before the other company's steamer, the *Great Western*, started. The *Sirius* got over in 16½ days, arriving ahead of her rival by a few hours. That was in April, 1838, and, a beginning once made, other steamers soon began to cross the ocean."

Mr. Hugh Harting, at p. 281 of *Notes and Queries* of April 14, 1917, gave some interesting information about the journey by the *Sirius*, quoting from an article by Mr. W. J. Barry in the *Journal of the Cork Historical and Archæological Soc.*, Oct.-Dec., 1905.

The *Edinburgh Review*, April-July, 1837, p. 118 *et seq.*, in reporting the meeting of the British Association at Bristol, in Sept., 1836, says, " A voyage was effected, in 1825, by a steamer from Great Britain to Calcutta, by the Cape, in 113 days. But this must not be understood as having been accomplished by the power of steam exclusively."

The article which (according to the *Dic. Nat. Biog.*) is by Dr. Lardner, is a long one, and is very pessimistic as to the practicability of crossing the Atlantic by steam power.

The following is an extract from an article which appeared in the *Globe* of Sept. 13, 1907, and is given because it names another rival of the *Royal William*, viz., the *Rising Sun* :—

"It is a far cry from the interesting performance of the *Lusitania* to the year 1818, when, as the records briefly indicate, the *Rising Sun*, built by Lord Cochrane, crossed the Atlantic, but a rapid survey of the progress made in the intervening period is not without interest. At first reductions made in the time taken to make the voyage were pretty substantial, and are to be counted in days. Thus, after reading that in 1819 the *Savannah*, 'aided by steam,' came from New York to Liverpool in 26 days, we are informed that the *Royal William*, built at Quebec, crossed the Atlantic, in 1833, in 21 days."

The *Daily Telegraph*, April 14, 1909, in an article on the death of Sir Donald Currie, said, "Just ten years before Currie went to Liverpool [in 1843] the first ship, relying for propulsion on steam alone, the *Royal William*, had crossed the Atlantic, doing the voyage from Pictou, Nova Scotia, to Gravesend in twenty-two days."

"The celebrations of the centenary of steam navigation in Great Britain began with appropriate festivity in Glasgow yesterday. One hundred years ago, on May 31 last, the *Comet*, the first steamship in Europe to be employed continuously in passenger traffic, was launched on the Clyde, and with it the name of Henry Bell, a native of Scotland, will for ever be associated. His was the first idea of steam navigation, though Robert Fulton, with whom he was associated, had an earlier success on the Hudson."—*Daily Mail*, Aug. 31, 1912.

"Ocean voyages by steamers were at first performed by vessels in which sail almost as much as steam was the power relied on. In this way the Atlantic was crossed in 1819 by the *Savannah*, a vessel 100 ft. long and of about 300 tons burden, the passage from Savannah to Liverpool occupying 25 days. In 1824 the steam yacht *Falcon*, of about 175 tons, proceeded from England to India, for the most part relying on sails. In 1825 the *Enterprise*, 122 ft. length of keel by 27 ft. beam, and of about 470 tons burden, made a passage from London to Calcutta in 113 days, ten of which were occupied by stoppages. The successful inauguration of transatlantic steaming is due to the *Great Western*, built for the Great Western Steamship Co. by I. K. Brunel, whose bold genius controlled the affairs of the company, and gave to the maritime world several of

its most notable steamships. She was 212 ft. long, 35 ft. 4 ins. beam, 23 ft. 2 ins. depth of hold, and registered 1,340 tons. Her engines, on the side-lever principle, were made by Messrs. Maudslay, Sons, & Field, of London, and were of 440 horse-power. On Sunday, April 8, 1838, the *Great Western* started from Bristol on her voyage across the Atlantic, her completion and despatch being hastened on account of the fact that, four days before, a vessel named the *Sirius* (taken from the service between London and Cork) had been despatched on the same voyage. The *Sirius* was smaller and less powerful than the *Great Western*, and both vessels arrived at New York on the same day, Monday, April 23—the *Sirius* in the morning and the *Great Western* in the afternoon—the passage thus taking 18 days and 14 days respectively."—*Cham. Ency.*, Vol IX., p. 403.

It is hardly necessary to point out the discrepancies of these accounts, and the author leaves his readers to form their own judgments of the case!

In contrast with all the foregoing let it be ever remembered that two Britons, Sir John Alcock, K.B.E., and Sir Whitten Brown, K.B.E., *flew* across the Atlantic in an aeroplane from Nova Scotia to England in 16¼ *hours* on June 14-15, 1919!

[For an authoritative account vide *Nature*, June 19, 1919, p. 306.] And that Major Scott and a crew in the rigid airship R 34 left East Fortune at 1.42 a.m. on July 2, and arrived at Long Island, New York, at 2 p.m., G.M.T., on July 6, 1919. [For an authoritative account of this see *Nature* of July 10, 1919, p. 369.] Both of these were the first crossings of their respective kinds.

That George Stephenson invented the Steam Locomotive

Henry Frith, in *The Romance of Engineering*, p. 189, says:—"Trevithick had initiated the steam-horse, Hedley had improved it, and Stephenson had adapted it. Trevithick had unfortunately failed in obtaining recognition for his high-pressure engine. Blenkinsop ran his locomotive in 1812; and in 1813, William Hedley, who had already been engaged on the locomotive steam engine, took out a patent for his smooth-wheeled engine."

Samuel Smiles, in his *Life of George and Robert Stephenson*, devotes Chap. V., p. 63, to the "Early History of the Locomotive—George Stephenson begins its Improvement." The last word at once explains that Smiles did not consider

Stephenson the inventor; in fact, this will soon be plain to anyone who looks into the matter.

Though Mr. H. Frith starts above with Trevithick, Smiles states that the first locomotive steam carriage was built at Paris by the French engineer Cugnot, the model of it having been made in 1763. In 1772 an American, Oliver Evans, invented a steam carriage. In 1784, William Symington was at work in Scotland on the same subject; and in the same year William Murdock, friend and assistant of Watt, constructed his model of a locomotive. Then came Richard Trevithick, Murdock's pupil. Stephenson carefully studied everything that was being done in the matter of steam locomotion in his own time and before, and then set to and completed his first locomotive, which was called "Blucher," and ran for the first time on July 25, 1814. His second was constructed in 1815, and his third in 1816. The "Rocket," constructed by Stephenson in 1829, seems to have been the first engine to run at a considerable speed, and was the first one to convince the more enlightened of the public of the usefulness of the locomotive.

C. E. Stretton (*The Development of the Locomotive*) states that undoubtedly the first builder of a locomotive was Trevithick, who had one running on smooth rails in 1803.

The first public railway was the Stockton and Darlington, which was opened on Sept. 27, 1825, Stephenson being the engineer, and his locomotive, which was used on this occasion, was named "Locomotion."

The Liverpool and Manchester Railway, opened on Sept. 15, 1830, was the first on a large scale, and this, too, was constructed under Stephenson's direction.

"Puffing Billy" (William Hedley's Patent No. 3666 of 1813) worked at Wylam Colliery from 1813 to 1862 and is now in the Victoria and Albert Museum. It is the oldest locomotive in existence. Stephenson's "Rocket" is in the same museum.

Ency. Brit. calls Trevithick the inventor and Stephenson the improver of the locomotive, and there is a window in Westminster Abbey in commemoration of Trevithick.

See also a *Manual of the Steam Engine* by Prof. Rankine (1866), pp. 25-27, wherein he states that in 1784 Watt patented a locomotive engine which, however, he never executed.

That Liberty Bell (in Independence Hall, Philadelphia, Pa., U.S.A.) was cracked when being rung on the Declaration of Independence on July 4, 1776

The history of this bell—like that of all belles—is interesting. It was cast in London in 1752, and was sent to America in the *Matilda*. After being hung it was found to be cracked, thus necessitating recasting. The first time this was done the result was not satisfactory, so it was recast a second time (also by Pass and Stow, of Philadelphia). It was the first bell rung on the Declaration of Independence on July 4, 1776, but it was not cracked until when it was tolled for the death of Mr. Justice John Marshall, who died on July 6, 1835.

The bell used to be in the belfry of Independence Hall, Philadelphia. It is now in a glass case on the ground floor under the belfry and near it is a tablet part of the inscription on which is, "It broke July 8, 1835 while tolling during the funeral solemnities of John Marshall, Chief Justice of the United States, who died in this city."

An attempt to overcome the jarring effect of the crack was made by boring a series of half-inch holes along the crack, but this unfortunately proved unsuccessful, for on again ringing the bell the crack extended still further up and now reaches from top to bottom.

The weight of the bell is 2,082 pounds. It cost £198 in London, and Pass and Stow were paid £60 13s. 5d. for the two re-castings. It is now considered priceless by Americans.

The following letter from Mr. L. Sterne is indeed a link with the past:—

"The Crack in The Liberty Bell.

"It may interest you to know that the crack in the 'Liberty' Bell at Philadelphia, you illustrate in Friday's issue, was filed out by me in 1849, at the age of 14, while I was in the employ of Bard & Son, Arch Street, Philadelphia.

"This was the first time it was filed out, and the bell was mounted and rung in 1850 and used at several subsequent 'Independence' celebrations until 1875 (just before the centenary in 1876), when the crack, showing a tendency to increase, was again filed out, this time by Cadwalder & Co., the well-known silversmiths of Philadelphia.

"I may add that I heard this bell ringing in 1876.

"Junior Carlton Club. L. Sterne."

Daily Mail, July 8, 1918.

That King Alfred of England allowed certain Cakes to burn

Maunder's *Treasury of History*, p. 87, gives the popular story, which we remember seeing represented at the Adelphi Theatre, London, many years ago, when the late Wilson Barrett was acting there in " The Christian King." Maunder gives the following footnote at p. 88 :—" On the source and value of this anecdote, see Lappenberg's *History of England under the Anglo-Saxon Kings*, Vol. II., p. 55, note 2."

Prof. Meiklejohn also gives the story, but Prof. Cyril Ransome does not.

Vide also the writings of Froude and Tom Hughes, and Francis Palgrave's *History of the Saxons*, Freeman's *Norman Conquest*, and Mathew Paris's *Chronica Majora*, Vol. I., p. 411.

Freeman, *op. cit.*, p. 121, says :—" The story has got into some copies of Asser's *Life of Alfred* from the book called Asser's *Annals*, which is undoubtedly a forgery. Most likely it comes from some life of Saint Neot, the author of which was anxious to exalt the saint and did not mind how unfair he was to the king."

The *Cyclo. of Names* says :—" The popular accounts of his life abound in legends which are devoid of historical foundation " ; while Hallam says :—" . . . . his fame has become almost as fabulous in legislation as that of Arthur in arms."

From p. 11 of the preface to *Alfred the Great*, edited, with preface, by Alfred Bowker, we quote, " It may seem strange to some readers that by chance no full account is given of Asser's anecdote of the scene between the King and the herdswoman in the Isle of Athelney, where he took refuge, but as the story is known to all, its omission may perhaps be pardoned ; it is certainly not due to any lack of interest in the story, which seems so strikingly to show that at times, may be when the King was resting or sitting by the fire mending his bows and weapons, he would become absorbed in the one thought foremost in his mind—that of the welfare of his country and people, then sorely harassed and oppressed by the Danes, and so neglected the homely duty that was present."

This appears to support the popular belief, but from p. 42 (which was written by Frederic Harrison) we quote as follows :—" We have long given up the venerable fables which once gathered round the name of Alfred, as round

Romulus or Theseus, King Arthur, or the Cid. . . . he was, perhaps, too practical a man to let his own supper get burnt on the hearth; and too wary a general to go about masquerading with a harp in the enemy's camp."

That King Alfred of England, when a Boy, won a Prize alleged to have been offered by his Mother to the First of her Three Sons who should be able to read a Book of Saxon Poems, the Prize being the Book itself

To begin with, the story should refer to King Alfred's stepmother, though one historical writer goes so far as to preface the popular story with the statement:—"Like many other remarkable men, he was the son of a clever woman. . . . She possessed a book of Saxon poems . . . etc." Miss Steele-Hutton, M.A., gives the following note and quotation on the subject:—

"(1) Osberga = Æthelwulf = (2) Judith of France, aged 12 years.

Æthelbald Æthelbert Æthelred Alfred.

"Æthelwulf was an old man when he married Judith, and he died four years later. Then Judith married her stepson Æthelbald!!

"Alfred was seven years old when Judith married his father, and you cannot imagine her acting as a patronising lady to stepsons (or brothers-in-law!) about her own age or older, and offering a book prize to them. Osberga died when Alfred was too young to win a prize for anything except squalling."

Freeman (*Old English History*, 1869, p. 115) says:—"Now it is a great pity that so pretty a story cannot be true. . . . Alfred was sent to Rome to the Pope when he was four years old; and if the Pope took him as his 'bishop-son' and anointed him to be king, one cannot help thinking that he would have him taught to read and to learn Latin. And it is certain that he could do both very well in after-life. Still, this is not quite certain proof, as he might have learnt afterwards. But this is certain: Alfred was not twelve years old till 861. By that time his brothers were not children playing round their mother, but grown men and kings, and two of them, Æthelstan and

Æthelbald, were dead. Moreover, in 861, Alfred's father, Æthelwulf, was dead, and his mother must have been dead also, as Æthelwulf married Judith in 856, when Alfred was only seven years old. If then anything of the kind happened, it could not have been when Alfred was twelve years old, but before he was four. For in that year he went to Rome, and could never have seen his mother again, even if she were alive when he went. And for a child of four years old not to be able to read is not so very wonderful a thing, even in our own time."

A footnote adds that two attempts were made to get out of the difficulty :—

" (1) *Osberga* (*Alfred's mother*) *was not dead when Æthelwulf married Judith.*

" No proof exists of this, and it is unlikely, when Æthelwulf was always on good terms with the Church. Apart from this, too, when Alfred was twelve, two of his brothers were dead and the other grown up.

" (2) *The story is true as relating to Judith, Alfred's step-mother.*

" Again we must repeat that when Alfred was twelve, two brothers were dead and one grown up. Judith herself was only twelve when she married Æthelwulf, and his two elder sons were much older than herself. Finally, in 861 (when Alfred was twelve) not only was Æthelwulf, her first husband, dead, but also his son Ethelbald (whom she married next), and she herself had returned to her father's Court in France."

That Adam and Eve were turned out of the Garden of Eden because they ate of the Fruit of an Apple Tree

It is, indeed, hard to understand how this misconception has arisen, for the language of *Genesis* III., vv. 17-24, could not very well be plainer. On referring to that chapter the reader will see that while there were several punishments for their disobedience, being expelled from the garden was not one of them. Vv. 22 and 23 are equally clear as to what was the reason for their banishment, for they say :— " . . . and now, lest he put forth his hand, and take also of the tree of life, and eat, and live for ever ; therefore the Lord God sent him forth from the garden of Eden, to till the ground from whence he was taken."

That Lady Godiva, Wife of Leofric, Earl of the Mercians, rode naked through the Market Place of Coventry

The *Cyclo. of Names* refers to this as a legend, and so also to the addition concerning "Peeping Tom."

Miss L. P. Steele-Hutton, M.A., wrote on Feb. 24, 1907 :— "Her husband was not the brutal tyrant that the story describes, but was loved by his people, and founded Coventry Priory, as well as many other religious houses. Freeman calls him the 'Grand old Earl of the Mercians.' The whole story is unsupported by evidence, even by probability, and the 'Peeping Tom' portion of it was added long afterwards to the original fallacy."

Ency. Brit. says :—"According to a well known popular tradition, exquisitely related in Tennyson's poem . . . A procession, instituted in the time of Charles II. in commemorative imitation of the event, continued for many years to be annually celebrated ; and an effigy called Peeping Tom is still pointed out projecting from an upper window at the corner of Smithford Street, popularly reputed to represent an inquisitive tailor, who was struck blind for having peered at the lady as she passed, while every other eye was averted in thankful reverence."

From all that we have heard of the "Merry Monarch" we can well believe that he did not look with disfavour on the procession in commemorative imitation, *i.e.*, provided it was sufficiently true to the story ! As to the "struck blind" part of the account, some will remember a similar story of Boccaccio.

Mr. C. E. Clark, *More Mistakes We Make* (1901), p. 30, refutes this story and points out that the Peeping Tom portion of it was added 200 years after the alleged event, while the "struck blind" part did not make its appearance till 700 years after !

Mr. A. S. Ellis, writing at p. 387 of *Notes and Queries* of Nov. 11, 1916, said, "The Coventry legend is not unlike the daring freak of an old widower's lively, charming, and impulsive young wife, acting more in opposition to her husband's wishes than even from a desire to show her sympathy with the townsfolk. . . . The Coventry legend is called by the late Prof. Freeman (*Old English History*, p. 278) 'a silly story,' but as Godiva is always called 'Lady,' not 'Countess'—a title unknown before Norman times—

this fact is suggestive of the story being much older than is suspected."

That Playing Cards were invented by a Frenchman and were first used to amuse Charles VI., the imbecile King of France

The following is from a catalogue of MM. Karslake and Co., of second-hand books :—

" Pack of Dutch pictorial playing cards, complete set of 52 and title card, 1720. In fine condition, £3 3s.

" Cards, originally derived from India, were introduced into Europe by the Saracens. They are noticed in Europe as early as 1275, and were known in England before 1464. Mention of them occurs in German MSS. between 1286 and 1384. They were used in Italy in 1299. The invention has long been erroneously attributed to the French."

The *Harms. Ency.* has a long illustrated article on cards, from which the following is extracted :—" Playing cards were known in Belgium as early as 1379 (D'Allemagne), though it was long believed they were invented in France in 1392 to divert Chas. VI. . . . As to the Eastern origin of cards, and the theories connecting them with the early Eastern occult philosophy, Dr. Willshire regards them as of too recondite and shadowy a character to admit of satisfactory discussion. He inclines to the belief that Italy was the European country, and Venice the district in which they first appeared."

T.P.'s Weekly, April 15, 1910, p. 469, had an article on " The Tarot Cards," and referred to two books, one of these being, *The Key to the Tarot*, by Arthur Edward Waite, who thinks cards are of Venetian origin and may date from about 1350. The popular story has no doubt arisen from the fact that in 1392, Gringonneur illuminated three packs of cards for the amusement of Charles VI. of France.

That Noble Families exist in the United Kingdom

E. A. Freeman, late Prof. of Modern History at Oxford, says (*American Lectures*, p. 306) :—" In England there is no nobility. The so-called noble family is not noble in the Continental sense ; privilege does not go on from generation

to generation; titles or precedence are lost in the second or third generation."

Bishop Stubbs, who preceded Prof. Freeman in the chair of Modern History at Oxford, says (*Constitutional History*, §188): "The great peculiarity of the baronali estate in England as compared with the Continent is the absence of the idea of caste: the English lords do nots answer to the nobles of France or to the princes and co unt of Germany, because in our system the theory of nobility of blood as conveying political privilege has no legal recognition. English nobility is merely the nobility of the hereditary counsellors of the Crown, the right to give counsel being involved at one time in the tenure of land, at another in the fact of summons, at another in the terms of a patent; it is the result rather than the cause of a peerage. The nobleman is the person who for his life holds the hereditary office denoted or implied by his title. The law gives to his kinsmen and children no privilege which it does not give to the ordinary freeman, unless we regard certain acts of courtesy, which the law has recognised, as implying privilege. Such legal nobility does not, of course, preclude the existence of real nobility, socially privileged and defined by ancient purity of descent or even by connection with the legal nobility of the peerage; but the English law does not regard the man of most ancient and purest descent as entitled thereby to any right or privilege which is not shared by every freeman. . . . Nobility of blood—that is, nobility which is shared by the whole kin alike—was a very ancient principle among the Germans, and was clearly recognised by the Anglo-Saxons in the common institution of *wérgild*."

That Pitt, the Elder, in replying to Walpole, used the expression "The atrocious crime of being a young man"

The words were composed and reported by Dr. Johnson in the *Gentleman's Magazine*.

Dr. Johnson was not even present in the House when Pitt spoke, but he heard of the speech and coloured it, and said (Boswell's *Life of Johnson*): "That speech I wrote in a garret in Exeter Street." The common belief in this case is very excusable, and *Bell's Standard Elocutionist* gives the whole speech as Pitt's, without comment.

That when the troopship *Birkenhead* was lost the British regiments were drawn up on deck, with the officers at the heads of their companies, and, at the word of command, a salute was given, a volley fired, and, with a British cheer, and the band playing "The Girl I left behind me," the flower of the British army went down shoulder to shoulder and not a soul except the women survived

When seen in cold print and in its collected form, does not this fallacy look absurd? Why must such heroism—for there is no doubt about the magnificent heroism and discipline displayed on that memorable occasion—be related with such a theatrical setting? What can be finer than the facts? And how ridiculous to attempt to bolster them up in this manner! It is equivalent to painting the lily.

"Seeing that the new drama at Drury Lane is to contain a realistic scene of the wreck of the *Birkenhead*, it may not be without interest to recall some of the most memorable incidents connected with that ever-memorable dramatic scene, even though they be somewhat different from the popular story.

"The *Birkenhead* was a splendid steamer of her kind, and served as a transport, carrying reinforcements for the troops at the Cape, comprising drafts of the 12th Lancers, 2nd Queen's, 6th Royals, 12th Regiment, 43rd Light Infantry, 60th Rifles, 73rd Regiment, 74th and 91st (Highlanders), on their way from Simon's Bay to Capetown. There were 630 persons on board—men, women, and children—and the troops were principally young men only recently joined, and not veterans, as might, from their fine discipline, be expected. On the morning of Feb. 26th, 1852, the *Birkenhead* struck on a rock about two miles and a half off Point Danger.

"In twenty minutes the fine ship broke up, and the story goes that as the boats containing the women and children were going away in the distance, containing the loves of the brave fellows on board, the British regiments were drawn up on deck, with the officers at the heads of their companies, and at the word of command the salute was given, a volley fired, and, with a British cheer, and the band playing 'The Girl I left behind me,' the flower of the English Army went down shoulder to shoulder and not a soul survived.

"It is a fine story, and the conduct of the men was undoubtedly fine—though hardly finer than on several other occasions. Fortunately, or unfortunately, however, like the 'Up, Guards, and at 'em' story, and the story of the pipes at Lucknow, the theatrical details are not true.

"Captain Wright, Lieutenant Girardot, and Cornet Bond were saved, as was also Surgeon William Culhane. Two engineers, two clerks, and R. B. Richards, the master's assistant, were saved, the loss being nine officers and 349 young recruits and the ship's crew. Captain Wright made a report, and gave every credit to the conduct of the men, which, he said, far exceeded anything he thought possible. Cornet Bond also, in the *Times* of April 6th, 7th, 8th and 9th, 1852, tells the whole story picturesquely.

"But neither of them nor any of the other contemporary reports give any of the romantic details of the troops being paraded and, after firing a salute, sinking shoulder to shoulder. It is true, however, that not one woman or child perished, and that of 630 souls on board only 180 escaped.

"A. M."

Daily Mail, Sept. 16, 1907.

That Queen Eleanor, Consort of Edward I., sucked Poison from the Arm of her Husband while he was on his Palestine Expedition

The expedition was the Seventh Crusade (1270—1272) which immediately preceded the accession of Edward I., so that it could not have been *Queen* Eleanor who performed the alleged act. Prince Edward so distinguished himself in the Holy Land that the infidels at length employed an assassin to destroy him, but though he was dangerously wounded he escaped with his life, and his assailant was put to death on the spot.

Prof. Cyril Ransome, M.A. (*Short Hist. Eng.*), does not mention the incident. Maunder (p. 188, *Treasury of History*) mentions the wound but not the anecdote. Mackay (Vol. II., p. 98 of *Extraordinary Popular Delusions*) quotes Fuller, who says the popular story is not true. Prof. S. R. Gardiner says Queen Eleanor had to be led out of the tent while an operation was performed, but there is no reference to the sucking of the wound. *Cyclo. of Names* does not give the incident, while the fullest account is given in *The Crusades* by

T. A. Archer and C. L. Kingsford from which we quote the following, p. 406 : " Edward's life was in much danger, for the weapon was poisoned, and though the Master of the Temple gave him what was declared to be a certain antidote, the wound grew daily worse. At last an English doctor pledged himself to effect a perfect cure. He bade the nobles lead the weeping Eleanor* from her husband's presence ; then he cut away the poisoned flesh, and thus under his care, Edward was within fifteen days able to appear on his horse in public."

Ency. Brit. says, " On account of his vigorous constitution he entirely recovered," and does *not* mention anything about Eleanor.

Cham. Biog. Dic. (1899) says, " That she sucked the poison from Edward's wound is mythical."

That King John of England was called " Lackland " because he lost Normandy and other possessions of England in France

Miss L. P. Steele-Hutton, M.A., writing on July 15, 1907, said, " He was called ' Lackland ' when in his cradle, because his father, who had mapped out his dominions among his other sons during his reign, had nothing left for this youngest son."

" . . . . and was in his boyhood nicknamed Lackland by his father, who divided his dominions among his elder sons. Henry loved him above any of his brothers, and made constant efforts to provide well for him."—*Cham. Ency.*

Maunder, Prof. Cyril Ransome, the *Cyclo. of Names* and Mrs. Roe do not refer to the matter.

That William the Conqueror Instituted the Curfew Bell

" Come, stir, stir, stir ! the second cock hath crow'd, the Curfew bell hath rung, 'tis three o'clock."—Romeo and Juliet, IV., iv., 4.

The usual derivation of this word is given as being from the French *couvrir* cover plus *feu* fire, the meaning being that when the bell rang, fires had to be covered or extinguished for the night. The *Concise Oxford Dic. ;* the *Century Dic. ; Ency. Brit.* and Dr. Brewer all give this derivation, but Mr. C. E. Clark at pp. 44-6 of his *More Mistakes We Make* (1901)

* The romantic story of her devotion is first related by Ptolemy of Lucca fifty years later;

connects it with "Carfax" and "Carfour" meaning four-roads, cross-roads, or town square, the place where the bell was and is rung.

The original time for ringing the bell was 7.0 p.m., but it gradually got to 8 p.m. and finally to 9.0 p.m. in England, and to 10 p.m. in Scotland. In the old play, *The Merry Devil of Edmonton*, we find, "Well, 'tis nine o'clock, 'tis time to ring Curfew." Shakespeare, as we see above, makes it ring as early as 3 o'clock!

Vide *Notes and Queries*, Sept. 11, 1920, p. 208.

Gardner, Maunder and Ransome do not go into the question, but the *Century Dic.* says Curfew probably existed before William's time, while *Ency. Brit.* says, "The curfew is commonly said to have been introduced into England by William the Conqueror, who ordained under severe penalties that at the ringing of the curfew bell at 8 o'clock in the evening all lights should be extinguished. It seems probable, however, that he merely enforced an existing very common police regulation to that effect. The absolute prohibition of lights after the ringing of the curfew was abolished by Henry I. in 1100."

It is said that the Chertsey curfew bell can claim unequalled historic associations. It was cast A.D. 1310, and to the present day rings the curfew during the Winter months.

Curfew was the central object of the story by Albert Smith, *Blanche Heriot; a Legend of Chertsey Church*, and formed the basis of the American poem by Rosa Hartwick Thorpe, *Curfew Shall not ring to night.*

Readers may be interested to learn that the curfew bell is still rung at North Tawton, Devon; Wimborne Minster; Mildenhall, Suffolk; Ashford-in-the-Water, Derbyshire; Sherborne; Lyme Regis; St. Cuthbert, Wells; St. Edward the Martyr, Corfe Castle; Hatherleigh, Devon; Winchester; Southampton; Romney; Midhurst; Cranbrook; Lichfield; Chippenham; Cushendall, County Antrim; Sandwich, East Kent; Hailsham, Sussex; Ross, Herefordshire; Godmanchester, Hunts; Romsey Abbey; Guild Church, Stratford-on-Avon; Trinity Church, Richmond, Yorkshire; Shaftesbury; St. Thomas, Newport, Isle of Wight; Attenborough, Norfolk; Kingscliffe; and Wokingham.

Ency. Brit. also points out another fallacy connected with curfew, "There is a popular tradition, for which no historical

authority can be assigned, that the severity exhibited by William the Conqueror in enforcing obedience to the curfew was more particularly designed to prevent the English from assembling in secret to plan schemes of rebellion against himself." The origin of this tradition Mr. Clark ascribes to " the Italian slanderer Polydore Vergil who wrote it 500 years after the event."

That the Magi followed the Star all the way from where they were until they found the Child Jesus in Bethlehem

It is only St. Matthew who gives us the account of the star, and on consulting his second chapter it will be found that the Magi saw the star in the East, and thereupon they went up to Jerusalem to inquire where Jesus was and to worship him. Herod asked the chief priests and the scribes where Christ was to be born and they told him in Bethlehem. Herod then sent the Magi to Bethlehem, " and they having heard the king, went their way ; and lo, the star, which they saw in the East, *went before them*, till it came and stood over where the young child was." In the first verse the Magi are described as coming from the East to Jerusalem, therefore they walked *west* to Jerusalem, though they saw the star in the *East*. Hence it is clear they did *not* follow the star in the first instance, but only after they got to Jerusalem, and then they had to follow it south, Bethlehem being south of Jerusalem.

That Pheidippides ran from Marathon to Athens to announce the Victory of the Greeks over the Persians in 490 B.C.

" Now that the Marathon Race is over and the story of Pheidippides is no longer required as a romantic setting, might I ask the authority for the legend in question ?

" We are told by Heredotus, Pausanias, and Cornelius Nepos that Pheidippides ran from Athens to Sparta to summon the Lacedæmonian troops to the help of the Athenian and Platæan forces against Darius, and reached the latter place in two days. But I can find no verification of the story of his twenty-six mile run from Marathon to Athens after his return from Lacedæmon.

" F. C. MARSH (Border Regiment).

" Strensall, York."—*Daily Mail*, July 28, 1908.

The *Cyclo. of Names* gives an account of the battle, stating that Marathon is 18 miles north-east of Athens, but does not

mention Pheidippides or any other runner. *Harms. Ency.* is also silent on the point, though it gives the distance as 25 miles. Brewer has no reference either to Marathon or Pheidippides.

That a Curse rests upon Families, and especially upon the eldest sons of Families, who buy or inherit Property Forcibly taken from the Church at the time of the dissolution of the Monasteries in the Reign of Henry VIII.

It is not often that a fallacy has been honoured with such an exhaustive inquiry as this one, and that by so distinguished a scientist as Sir Francis Galton, F.R.S.

It was owing to his niece, Miss Biggs, that the investigation was made. Sir Francis drew up a series of questions, the answers to which would show the successive owners of estates, the relationship of each owner to his predecessor, the duration of the ownership, and the circumstances under which the property passed to a new family. The antiquary, the Rev. Harvey Bloom, of Whitchurch, near Bradford-on-Avon, took 245 of the question forms and answered the questions in connection with the 245 estates during the century 1800 to 1900. Half of these estates were formerly Church property, and should have given evidence of " the curse " (if any), while the other half should not have had any unpleasant incidents connected with them. Dr. Edgar Schuster, M.A., D.Sc., Fellow of New College, Oxford, analysed the replies, with the result that the figures exhibited practically no difference as between Church and non-Church properties, and no curses upon the eldest sons. The Church estates during the nineteenth century had 464 owners, of whom 240 were eldest sons. The non-Church properties had 459 owners, of whom 241 were eldest sons. A remarkable agreement.

Attention is drawn to the great amount of work that had to be done to refute this fallacy. Such work should really not be necessary, for it is incumbent on those who *make* such statements to support them by evidence of a quality equal to that collected by Sir Francis.

That Alfred the Great was King of all England and that he Founded the University of Oxford

Frederic Harrison (*Alfred the Great*, p. 42), " We have long given up the venerable fables which once gathered round the name of Alfred. . . Every schoolboy knows that

Alfred was not formally king of all England ; nor did he introduce trial by jury, or electoral institutions ; he did not found the University of Oxford ; nor write all the pieces which are attributed to his pen. . . and was too wary a general to go about masquerading with a harp in the enemy's camp. But the historic Alfred whom we know to-day is a personage more splendid and lifelike than the legendary Alfred ever was."

That the Punishment of being Blown from the Muzzle of a Gun was invented by Sir Mountstuart Elphinstone

" BLOWING FROM GUNS.—It has always been supposed that the punishment of blowing from guns, the most horrifying of all to the religious faith of those on whom it was inflicted, was the infernal invention of Mountstuart Elphinstone. Mountstuart inflicted it, certainly. " A supposed conspiracy of the Mahrattas was dealt with promptly by Mountstuart Elphinstone, and the reputed leaders, Brahmins of high rank, were blown from guns." Mr. J. S. Cotton, however, shows that Sir Mountstuart Elphinstone was neither the inventor nor even the first adopter of this ferocious punishment. It was, as indeed you might expect, of Eastern origin, and had been borrowed immediately from the Mahrattas themselves. From them it had been adopted in 1764 by Sir Hector Munro. Nothing in the history of the Indian Mutiny struck me more than the jeers of that Christian Saint, Sir Henry Havelock, at the humane scruples of a subordinate whom he had ordered to blow some sepoys from the guns."—*T.P.'s Weekly*, Feb. 14, 1908.

That the Dagger in the Arms of the City of London was given by King Richard II. on account of the Lord Mayor (Sir William Walworth) having Killed Wat Tyler, the Leader of the Kentish Iron-founders' Rebellion

" At the head of the stairs (Fishmongers' Hall) is Pierce's statue of Sir William Walworth, a Fishmonger, who carries a dagger. In his hand was formerly a real dagger, said to be the identical weapon with which he stabbed Wat Tyler ; though, in 1731, a publican of Islington pretended to possess the actual poniard. Beneath the statue is this instription :—

' Brave Walworth, Knight, Lord Mayor yt Slew
Rebellious Tyler in his Alarmes ;
The King, therefore, did give in Lieu
The dagger to the Cityes Armes.'

" ' In the 4th year of Richard II., Anno Domini 1381.'

" A common but erroneous belief was thus propagated, for the dagger was in the City arms long before the time of Sir William Walworth, and was intended to represent the sword of St. Paul, the patron saint of the Corporation."—Walter Thornbury's *Old and New London*, Vol. II., p. 5 (1897).

Mr. C. E. Clark also calls attention to this error.

In 1592, Richard Johnson wrote *The Nine Worthies of London ; explaining the honourable Exercise of Arms, the Virtues of the Valiant, and the Memorable Attempts of Magnanimous Minds ; pleasant for Gentlemen, and not unseemly for Magistrates ; and most profitable for 'Prentices.*

In this work the Worthies are made to tell their own stories in rime, and Sir William Walworth, in discoursing on himself, writes :—

" Among their troops incensed with mortal hate,
I did arrest Wat Tyler on the pate.

" The stroke was given with so good a will,
I made the rebel couch unto the earth ;
His fellows that behind (though strange) were still.
It marred the manner of their former mirth.
I left him not, but ere I did depart,
I stabbed my dagger to his damned heart."

" The City Arms.

" A committee of the Common Council has been sitting in order to establish authoritatively what are the correct arms of the City of London. It will be a surprise to most Londoners that any doubt exists on the subject. There is the cross and dagger, the dragon supporters, the well-known motto, the winged crest. The dagger is the dagger with which Wat Tyler was slain by Sir William Walworth ; and beneath the statue of that worthy in Fishmongers' Hall there runs the inscription (given above, beginning " Brave Walworth)." But this, it seems, is all mere legend—untrustworthy and without foundation.

" A Sword, not a Dagger.

" The dagger appeared on the arms before Walworth saved the King's life ; it is indeed no dagger, but a sword—the sword of St. Paul, the patron saint of London. And as a sword, the committee recommend, it should be represented in future. Nor should the cross be given that curious raised appearance.

It is a plain red cross—the cross of St. George, fittingly borne by the national capital. Then it appears that the dragons are mere seventeenth century parvenus, successors to earlier lions ; that the motto is newer still, and that the fur cap has often been shown in place of the wing-crest, which was once no wing, but ' a fan-like object.' But there are to be no changes here : the dragons with crosses on their wings are to stay ; the crest and the motto are to remain unaltered. Only the shield is to be restored to its ancient form."—*Westminster Gazette,* July 12, 1911.

In the *Daily Graphic* of July 11, 1911, there appeared a carefully illustrated article on the subject and giving the correct coat of arms reproduced from the report of the General Purposes Committee of the Court of Common Council.

Wat Tyler was wounded by Walworth in Smithfield on June 15, 1381. On the obverse of the Common Seal of the Court of Common Council, which dates from about 1225, appears the figure of St. Paul holding what is plainly a sword and not a dagger in his right hand. Dr. Sharpe, the Records Clerk of the City, points out that even the Mayoralty Seal of 1381 had been produced, adopted, and in use before the incident in Smithfield.

Vide " That Sir William Walworth killed Wat Tyler."

That the information concerning the abandonment of " Protection " and adoption of " Free Trade " by Peel, which appeared in the *Times* in December, 1845, was extracted from Sidney Herbert, Secretary for War, through the blandishments of Mrs. Norton and Sold by her to Delane, the Editor

The following are two extracts from the life of *John Thadeus Delane,* by A. I. Dasent (1909) :—

" The wildest stories were circulated in town as to how the *Times* had obtained its exclusive information. A false and malicious report to the effect that the news had been extracted from Sidney Herbert through the blandishments of Mrs. Norton, and communicated by her to Delane, obtained wide currency. Such is the inveteracy of error that many years afterwards this groundless insinuation was reproduced (much to the annoyance of Sheridan's descendants) by George Meredith in his Novel *Diana of the Crossways,* and from time to time paragraphs appear in the newspapers and magazines perpetuating the fiction."

The news was, in fact, given to Delane by Lord Aberdeen. The result of the information in " The Thunderer " afterwards proving to be true was that, " the *Times* at a bound achieved a supremacy amongst its fellows which no one amongst them could wrest from it, and though . . . the Queen's Speech contained no direct reference to the Corn Laws in the course of the debate on the Address, Peel declared that his opinions on the subject of Protection had ' undergone a change,' and that he could no longer undertake to direct the course of the Ship of State by observations taken in 1842."

The Editor of *T.P.'s Weekly* dealt with the matter in the issue of that paper for Dec. 31, 1909 :—

" Another figure who lives again in the pages of Lady St. Helier has been almost effaced from the memory of the present generation ; I mean Mrs. Norton. Some people will remember the controversy which took place some years ago when George Meredith published his *Diana of the Crossways*. The story was of a beautiful and bewitching woman who became the friend of a Cabinet Minister, and who sold a secret which he accidentally allowed to fall from his lips in the privacy of their house. The lady is represented then as going to a newspaper office and selling the precious secret to the newspaper—of course, for a large sum. The originals of the story were said to be Sidney Herbert, who was Secretary for war in the fifties, and Mrs. Norton ; the secret was Peel's resolve to abandon Protection and to propose Free Trade ; and the newspaper was, of course, the *Times*. Lord Dufferin came out with an indignant denial of the story, and defended the memory of Mrs. Norton—she was, I believe, his aunt—and George Meredith wrote an apology. Since then other memoirs have been published which prove that the whole story was founded on a misapprehension. Mrs. Norton was known to an earlier epoch not merely as a dazzling beauty who had turned the heads of innumerable Statesmen, but also as a writer of very brilliant powers, and equally at home in verse and prose. I have read a great deal of what she wrote, and some of it is extremely good."

John Fyvie, p. 251, *Some Famous Women of Wit and Beauty* (1905), writing of George Meredith's *Diana of the Crossways*, says, " The plot, if plot it can be called, of Mr. Meredith's brilliant and fascinating story hinges upon Diana's betrayal of the Cabinet secret confided to her by her young statesman lover. This appears to be a gratuitous blot on the

character of the heroine of the book, which most readers will feel that no tears of pity can ever wash out. It is founded on a story that Mrs. Norton betrayed to Delane, Editor of the *Times*, the secret, confided to her by Sidney Herbert, one of her ardent admirers, that Sir Robert Peel and his Cabinet had resolved upon a repeal of the Corn Laws. The secret certainly did leak out, and caused a serious Government crisis; but the story that Mrs. Norton was the culprit appears to have no foundation whatever."

That the Kilt is the National Dress of Scotland

It is part of the Highlanders' national dress. "It may be well to point out that the general belief south of the Border that the kilt is the national dress of Scotland is erroneous. The kilt belongs wholly to the Highlands, and never was used in the Lowlands at any period at all. A Scottish Lowlander of the present day feels the kilt to be as foreign to his associations, and also his hams, as any southron among them all. Indeed, even in the Highlands also the kilt is almost extinct. It was rigorously suppressed by Act of Parliament after the '45, and though once more tolerated in 1784 was never resumed by any considerable portion of the people. It may be said that it owes its existence now chiefly to the national ardour of a few societies who aim at preserving at least some recollection of circumstances, language, and habiliments which have sunk before the social improvements of the last century."—*T.P.'s Weekly*, Aug. 7, 1908.

That Edward I. promised the Welsh he would give them a Prince who could not speak English, and thereafter presented to them his Infant Son, Prince Edward

Prof. Cyril Ransome says Edward *is said* to have won the favour of the Welsh by the promise, and Prof. S. R. Gardiner says he offered the child to them as their prince, but the *Dic. of Nat. Biog.*, Vol. XVII., p. 38, "Entirely apocryphal are the stories of the king presenting his infant son as the future native sovereign of the Welsh (they first appear in Stow, *Annals*, pp. 202-3, and Powel, *Hist. Cambria*, ed. 1584, p. 377). The tradition which fixes the room and the tower of the castle in which Edward was born is equally baseless."

Maunder does not give the story.

"Edward II. (1284-1327), 'of Carnarvon,' King of England, the fourth son of Edward I. by his first wife Eleanor of

Castile, was born at Carnarvon Castle on the 25th April, 1284. The story that the king presented the newborn child to the Welsh as their future native prince is quite unfounded, for Edward was only made Prince of Wales in the Lincoln Parliament of 1301."—*Ency. Brit.*, 11th ed., Vol. VIII., p. 993.

That William I. of England was called "the Conqueror" on account of his Victory at Hastings

A very natural mistake, which appears to be due to a change in the meaning of the word "Conqueror," for Prof. S. R. Gardiner says, "The word did not mean once what it means now. It did not mean a man who obtained his kingdom by a victory in war, but a man who obtained something which he did not possess before, whether he fought for it or not."

Prof. Cyril Ransome says, "He . . . . looked upon himself, not as a conqueror, but as the rightful sovereign of the English."

"William, we must remember, did not give himself out as a conqueror. The name *Conqueror, Conquæstor*, though applied with perfect truth in the common sense, must strictly be taken in the legal meaning of *purchaser* or *acquirer*. William claimed the crown as the lawful successor of Edward . . . . The peculiar character of the Norman Conquest comes from this, that a legal claim to the crown was made good through conquest by a foreign army. William's accession was something quite different from the mere peaceful succession of a foreign king. It was also something quite different from a mere foreign invasion without legal pretext at all."—*Ency. Brit.*

"Such was William the Great, a title which, in the mouths of his contemporaries, he shared with Alexander and with Charles, but which, in later times, has been displaced by the misunderstood description of Conqueror." p. 626, "It has been pointed out by more writers than one that a certain amount of confusion is involved in the familiar description of the great King—Duke as William the Conqueror. He is not often called 'Conquæstor' by writers of or near his own time. Moreover, 'Conquæstor' hardly means 'Conqueror' in the common sense of that word, but rather 'Acquirer' or 'Purchaser,' in the wider legal sense of the word 'purchase.'"—*The Norman Conquest of England*, by Prof. E. A. Freeman, M.A., 3rd ed., Vol. II., p. 175.

In addition to claiming to have obtained from Edward the Confessor a promise of the succession to the English throne, and having apparently also extorted an oath from Harold (when he had the latter in his power) by promising assistance, William obtained a bull from Pope Alexander II., declaring him to be the rightful heir to the throne. In short he prepared his poor case with all his admitted ability!

That there were any "Knights of the Round Table" in "King" Arthur's time

"Arthur. A British chieftain who lived in the 6th Century. He fought many battles, and was killed at the battle of Camlan. He was buried at Glastonbury. In the time of Henry II., according to Geraldus Cambrensis and others, his remains were discovered there. Hennius, a Breton monk, left in the 10th Century a short Latin Chronicle which is the earliest authentic account we have of him. He is celebrated in Welsh, Breton and old French romance, but his actual existence and deeds have very little to do with the origin of the cycle of romances to which his name is given, as around him myths relating, probably, to some remote ancestor or ancestors have crystallized. . . . . Geoffrey of Monmouth (about 1140) may, perhaps, be considered as the source of the legends. [The Arthurian Cycle of Romances.] They were 'Breton romances amplified in Wales and adopted at the court of the Plantagenets as the foundation of the epic chivalry.'"—*Cyclo. of Names.*

". . . . we come to that mysterious interval inhabited by the vague legend of Arthur and his Knights."—Dr. E. A. Baker, D.Litt., in *T.P.'s Weekly* of April 11, 1913.

"Arthur, King of the Siluri—British races driven back into the West of England by the Saxons . . . . He is said to have lived in the 6th century, and to have maintained a stubborn contest against the Saxon Cerdic, but the Saxon Chronicle is suspiciously silent as to his warfare and as to his existence. Indeed the Welsh bards of the earliest period do not assert that he was a contemporary, and it is more than doubtful whether he is an historic personage . . . . Mr. Thomas Wright has shown (*Biographia Literaria*, Saxon period) that his history is a forgery of a much later date, probably of the 10th century. Mr. Skene, however (*The Four Ancient Books of Wales*, Vol I., pp. 50-60), makes fight to give Arthur an historic place, and we do not deny that there

may have been a prince of that name . . . . In these [romances], his habitual residence is at Cærleon, on the Usk, in Wales, where, with his beautiful wife Guinevere, he lives in splendid state, surrounded by hundreds of knights and beautiful ladies, who serve as patterns of valour, breeding, and grace to all the world. Twelve knights, the bravest of the throng, form the centre of his retinue, and sit with the king at a round table, the ' Knights of the Round Table.' "—*Chamb. Ency.*, Vol. I., p. 461.

Prof. Andrew Lang, M.A., has a good deal on the subject of Arthur in his *History of English Literature* (1912), pp. 42-7, in which he appears to be somewhat inconsistent, for while repeatedly referring to the *legends* of Arthur, and saying " if ever there were a real fighting Arthur," and, " Bede, the historian, writing about 700-730, *says nothing about Arthur*, but he does speak briefly about the period (500-516) in which Arthur, if there were such a prince, must have existed," and, " All these legendary and fictitious materials, and others . . . ." nevertheless also says, " We need not, then, give up Arthur as a fabulous being, though legends far older than himself came to be told about him."

That according to the Biblical story only *two* of each kind of Animal were taken into the Ark

In *Genesis* VI., v. 19 *et seq.*, we read, " And of every living thing of all flesh, two of every sort shalt thou bring into the ark, to keep them alive with thee ; they shall be male and female. Of the fowl after their kind, and of the cattle after their kind, of every creeping thing of the ground after its kind, two of every sort shall come unto thee, to keep them alive." And in Chap. VII., v. 2 and 3, " Of every clean beast thou shalt take to thee seven and seven, the male and his female ; and of the beasts that are not clean two, the male and his female ; of the fowl also of the air, seven and seven, male and female : to keep seed alive upon the face of all the earth."

v. 8 and 9, "Of clean beasts, and beasts that are not clean, and of fowls, and of everything that creepeth upon the ground, there went in two and two unto Noah into the Ark, male and female, as God commanded Noah." v. 15 and 16, " And they went in unto Noah into the Ark, two and two of all flesh wherein is the breath of life. And they went in, went in male and female of all flesh, as God commanded him : and the Lord shut him in."

In the *Harms. Ency., sub* 'Deluge', we read, " The story (*Gen.* VI., 9) is certainly composite, and here and there shows considerable inconsistencies: for example, in VI., 19, 20, one pair of every kind of animal is to be taken into the ark, while in VII., 2, one pair of unclean and seven pairs of clean beasts are to be selected. These passages belong to the sources P. and J. respectively. (See *Hexateuch.*) Chaps. VII. and VIII. contain statements regarding the duration of the inundation hard to reconcile with each other—*cf.* VII., 12 (J.) and VIII., 3 (P.). It is thus impossible to construct from the Biblical narrative anything like a uniform and detailed account of the event unless, moreover, the acceptance of the story as literally and historically accurate requires us to postulate a congeries of miracles hardly even to be imagined. Besides this, the deluge legends are found in the folklore or early literature of almost every nation or race of human beings."

That Edward I. summoned all the Welsh bards to meet at Conway and then had them put to Death

Prof. Cyril Ransome and S. R. Gardiner do not mention the incident, but Mrs. Roe (*Sketches from English History*, p. 115) says, " Edward is said by some writers to have summoned all the Welsh bards to meet at Conway, and there, on the pretence that their songs would keep alive the spirit of freedom among the people, they were all, by his command, put to death. This traditional story, though generally believed in Wales, does not appear to have any foundation in truth."

The following is the introduction to " The Bard," by Thos. Gray in *The Poetical Works of Thomas Gray* (p. 38) :—

" This Ode is founded on a tradition current in Wales that Edward the First, when he completed the conquest of that country, ordered all the Bards that fell into his hands to be put to death. *Gray.* (See Barrington on the *Statutes*, p. 358 ; Jones's *Relics*, Vol. I., p. 38 ; Sayer's *Essays*, p. 20.)"

" What Edward had really done was to break the Welsh resistance. His policy of justice (for the ' massacre of the bards ' is a mere fable) accomplished its end, and in spite of two later rebellions Wales ceased to be any serious danger to England for a hundred years."—J. R. Green, *Short Hist. of the English People*, p. 169.

That Shorthand was Unknown before Sir Isaac Pitman Invented his well known system in 1837

A brief reference to *The History of Stenography in Antiquity and the Middle Ages*, by Eugène Guénin (official reporter to the French Senate) and Louis Prosper, will soon dispel the above misconception.

In 1588 Timothy Bright, rector of Methley, Yorkshire, published his *Characterie; an Arte of Shorte, Swifte, and Secrete Writing by Character*. In 1602 John Willis wrote *Arte of Stenographie*. Pepys' celebrated *Diary* was written in Thomas Skelton's system. William Tiffin's phonetic system (thus closely resembling Sir Isaac's) was brought out in 1750, and was followed by other phonetic systems, viz., David Lyle's, 1762, and Holdsworth and Aldridge's in 1766. William Mason invented his system in 1672, and Dr. John Byrom's was published in 1767, *i.e.*, after the death of its inventor. Dr. W. F. Mavor followed in 1780, Samuel Taylor in 1786, and James Henry Lewis in 1812.

The following matter is from *Notes and Queries*, of Oct. 16, 1915, p. 295 :—

" John Angell, the Literary Feltmaker.

" Several inquirers in ' N. and Q.' of 1870 (4 S. v.) assumed that the author of ' Stenography; or Short-Hand Improved,' was the professor of shorthand who lived for many years in Dublin, and this assumption was rather encouraged by writers on shorthand and the Catalogue of the British Museum Library. The fact would appear to be that there were two of these John Angells—father and son.

" John Angell, senior, who hailed from Chichester, was by business a feltmaker in St. Clement Danes, London. By his will, made on March 20, 1764, he disposed, among other things, of (1) the plates, copies, and copyright of ' Stenography ; or Short-Hand Improved ' ; (2) the copies and copyright of ' An Essay on Prayer ' ; and (3) the copyright, when publication was completed, of ' The History of Religion,' which was then ' publishing in weekly numbers ' under an agreement with Chr. Henderson, Wm. Nicoll, and Joseph Johnson. The will was proved on April 17, 1764 (P.C.C. Simpson, 128), and the beneficiaries were his children : John, Mary (who was appointed sole executrix), and Ann.

" According to the will the testator had two *l*'s in his name ; it is so engraved in the title-page of ' Stenography,' and at the

end of the preface of the signed and numbered copies of that work the signature is so written. The British Museum at present allows him only one.

" Following the preface of ' Stenography,' there is a list of 105 subscribers and nine of these are Chichester people.

" (1) The first edition of ' Stenography ' (B.M. press-mark 1043, l. 8), issued in 1758 (see *Critical Review* for Oct., 1758), was ' printed for the Author ' and sold by several booksellers. The second edition (B.M. press-mark 7942, e. 21), ' printed for & sold by M. Angell in Lincoln's Inn Passage ' and others, was probably issued in 1765—about a year after the author's death. In later editions the name of John Angell of Fownes Street, Dublin, also appeared as a seller of the work he edited."

The author has a copy of

" *Brachygraphy*
or
an easy & Compendious system of
Short-Hand,
Improved
after more than Forty Years Practice & Experience
By Thomas Gurney :
And brought still nearer to Perfection upon
the present Method
By Joseph Gurney.
The Thirteenth Edition
London.
Mar. 5, 1803."

Even these are comparatively modern, for some systems of contracted writing appear to have been in use in Greek and Roman times, while the Egyptian hieroglyphics are a form of shorthand.

That only Three Examples of Queen Anne's Farthings were Coined

John Timbs, F.S.A., p. 281, *Notabilia*, gives the following quotation from the *Cornhill Magazine* (no date) :—

" Often and often have officers of the British Museum received letters asking whether, as the writer was in possession of the third of the farthings, of which the Museum had the other two, he was not entitled to some £1,000 or so ; and grievous, no doubt, has been his disappointment at being told that his fancied treasure might possibly be worth some

four or five shillings. How the delusion ever originated it is impossible to say ; but one account tells that a lady in Yorkshire, having lost one of these farthings, which she valued as the bequest of a dear friend, offered a very large sum for its recovery, and this gave rise to a false impression of the value of any specimen. It is commonly believed that only three examples of the farthings were struck off, because it was found that there was a flaw near the bridge of the Queen's nose ; another account says the die broke in two. There are really no fewer than five or six different patterns of the farthing, but most of them were never issued."

Mr. Till, the coin dealer, stated that hundreds of Queen Anne farthings were struck and circulated.

Vide p. 217, *Things not Generally Known*, First Series.

". . . Certain pattern farthings were struck in the years 1713-14, known as ' Queen Anne's farthings.' Five distinct varieties are known to exist. The scarcity and value of the pieces, which are indeed not rare amongst collectors, has been strangely exaggerated."—*Cham. Ency.*, Vol. IV., p. 554.

That the Battle of Bunker Hill was Fought solely on the Hill of that Name

" Bunker Hill, an elevation (112 ft.) on the peninsular of Charlestown, now part of Boston, Mass., connected by a ridge, 700 yards long, with Breed's Hill (75 ft.). The two heights were the scene of the first hard-fought battle of the American Revolution (June 17, 1775)."—*Cham. Ency.*

" It gives name to the famous battle fought June 17, 1775, chiefly at Breed's Hill, Charlestown. . . ."—*Cyclo. Names.*

That the Great Hall at Hampton Court was Built by Cardinal Wolsey

The Great Hall and the chapel were built by Henry VIII. during the period 1531-5. The Great Hall is one of the few existing places (Middle Temple Hall—built 1572—being another) in which a play by Shakespeare was acted during his lifetime. In fact, Shakespeare *acted* in this Great Hall, and one of the last plays acted in it was " Hamlet," on Jan. 24, 1637, after his death in 1616.

Mr. Ernest Law points out the error in his *Hampton Court Illustrated* (p. 29).

That Safety-Pins are a comparatively Modern Invention

Safety-pins, dating back from before the Roman Conquest, have been found in England, and the writer has seen some silver ones which were found at Dover, and which probably were of Roman origin.

"A few have double stems like modern hair-pins, and three found at Peschiera are exactly the same in form as the 'safety pins' which have come largely into use in recent years."—*Chamb. Ency.*, Vol. VIII., p. 189.

That Flint-working is a Lost Art

Mr. W. A. Dutt wrote on Jan. 30, 1911 :—

"Evelyn, in his *Diary*, states that when he visited Sir Thomas Browne in Norwich in 1671, Sir Thomas pointed out to him 'buildings of flints, so exquisitely headed and squared, as I was much astonished at; but he (Sir Thomas) told me they had lost the art of squaring the flints, in which they once so much excell'd.'

"The gunflint-makers at Brandon in Suffolk still square and otherwise shape flints for the so-called 'flush-work' of flint panelling for which many of the East Anglian churches are remarkable. Some archæologists believe that flint-knapping has been carried on at Brandon without intermission since prehistoric times. Several of the living knappers are very skilful in flaking and chipping flint axes, knives and arrowheads in imitation of the tools and weapons of the Stone Age men. Flint-working is also done near London, and in France. At Brandon the knappers are chiefly engaged in manufacturing gunflints for export.

"An American writer recently asserted that flint-working was a lost art, despite the fact that numerous accounts of the existing industry at Brandon have been printed in late years."

That the Ancient Britons were Savages

Mr. W. A. Dutt wrote on Dec. 17, 1910 :—

"Is it not a popular fallacy that the ancient Britons were savages? They certainly were not. Their enamelling eclipsed anything of the kind done on the Continent at the time and some of their pottery is beautifully shaped and ornamented."

They had a system of coinage; fought from chariots; had spears, shields and armour, and their fleet was such

that when it combined with that of the Bretons, even the great Cæsar found it was much superior to his own. "From the time of Cæsar's invasion, and during the following 400 years of Roman occupation, the Celts of South Britain were presumably quite abreast of all that was most advanced in European culture . . . . The life of such a town as Silchester, as shown by the very interesting relics preserved in the museums at Reading, was clearly that of a highly-civilized people."—*Harms. Ency.*, Vol. II., p. 594.

That Canute Sat on the Sea-Shore and Commanded the Sea to Retire

"I pray you, think, you question with the Jew:
You may as well go stand upon the beach,
And bid the main flood bate his usual height;"
Merchant of Venice, IV., i., 70.

"The famous story, telling how he rebuked the flattery of his courtiers by showing them that the advancing waves on the sea-shore had no regard for his kingship, is given by Henry of Huntingdon, who adds that never after would the king wear his crown, but hung it on the head of the crucified Lord."—*Chamb. Ency.*, Vol. II., p. 730.

Under 'Henry of Huntingdon' the *Dict. Nat. Biog.* states, "he enlarges partly from oral tradition (as in the story of Canute and the Sea), and partly from his own invention."

Canute was born about 994 and died 1035. Henry of Huntingdon was born about 1084 and died 1155, so he wrote the story about 100 years after the alleged event occurred.

Profs. Oman, Ransome, and Gardiner do not mention the story.

Ency. Brit., 9th ed., has, "The well-known story of the rebuke he gave his courtiers, which rests on excellent authority, is proof of this . . . ."

Ency. Brit., 11th ed., has, "His humility is finely illustrated by the old Norman poem which describes how he commanded the rising tide of the Thames at Westminster to go back. The homily he preached to his courtiers on that occasion was to prepare them for his subsequent journey to Rome and his submission to the Holy See."

That Royal Oak Day, or Oak-Apple Day (29th May) was the day on which Prince Charles (afterwards Charles II.) hid in the Royal Oak Tree at Boscobel

In olden times the partisans of Charles II. used to wear oak leaves or oak-apples on the 29th May in memory of the Restoration of the Monarchy and Charles's entry into London on his birthday, May 29, 1660. The selection of the symbol was, no doubt, determined by the fact that after the Battle of Worcester on Sept. 3, 1651, Prince Charles, as he then was, had hidden in an oak tree at Boscobel which thenceforth became known as the Royal Oak. The mistake has evidently arisen from the names given to the day, being singularly misleading. " Restoration Day " would have been more suitable and certainly less misleading.

Mr. C. E. Clark, p. 211, *Mistakes We Make* (1897), " Scientific evidence shows that the tree, being only 11 ft. 10in. in girth, could not have been the pollard oak of nearly two and a half centuries ago.

" In 1817, an inscription, afterwards removed, expressly intimated ' the present tree ' to have sprung from the Royal oak. Actually it has been ascertained that the original tree, whether deserving of the celebrity attached to it or not we would not care to say, disappeared soon after 1787, the oak long before that date having been almost cut away by relic hunters who came to see it."

Vide *Notes and Queries*, June 12, p. 293 ; June 26, p. 339 ; and July 24, p. 78, all of 1920.

That Jonah was Swallowed by a Whale

" The Hebrew only speaks of ' a great fish,' without particular specification ; in *Matt.* XII., 40, that fish is translated ' whale ' (κῆτος) ; but the Greek, like the Hebrew, is general, and strictly means only a ' sea-monster.' A whale has too contracted a throat to swallow a man ; * but sharks capable of doing so are not uncommon in the Mediterranean." —p. 95, *Helps to the Study of the Bible*, Oxford, 1891.

Chamb. Ency. (' Jonah ') seems to treat the whale story as allegorical, and *Harms. Ency.* is inclined to do the same. " The incident of the whale has parallels in Babylonian, Egyptian and Greek mythology."—*Cyclo. Names.*

* This is not true of all whales.

That Eunuchs were introduced into Europe by the Turks

" It is a common fallacy to suppose that the Turks introduced eunuchs to Europe. This is the reverse of fact. They found them at Constantinpole, an institution firmly rooted and centuries old."—Z. Duckett Ferriman, p. 125, *Turkey and the Turks*, 1911.

Harms. Ency. refers to them as having been employed in Egyptian and Babylonian times. Until as recently as 1878 they were in demand as singers, and it was only in that year that Pope Leo XIII. prohibited the employment of *castrati* in the papal choir.

That the first English Prince of Wales (afterwards Edward II.) was born in Carnarvon Castle

The official guide, compiled by the late Sir Llewellyn Taylor, states that Edward II. was born in the castle.

Mr. C. E. Clark writes, " It has been proved beyond doubt by the well-known archæologist, Mr. Albert Hartshorne, that the castle was barely commenced by Edward I., and not finished till 33 years after the babyhood of his fourth son."

" Born at Carnarvon " is the phrase used by Profs. Gardiner, Oman and Ransome and Mr. Maunder, but it is to Mr. P. H. Ditchfield, M.A., F.S.A., the antiquary, that we are indebted in this matter, for he dealt with it fully in *The Church Times* of July 14, 1911, from which the following is abstracted :—

" Soon the old walls of Carnarvon Castle will be resounding with the shouts of patriotic Welshmen, when their Prince will be invested with the distinguished signs and badges of his high office and dignity, and receive the homage of his people. It was a happy thought of His Majesty King George V. or of his advisers to select that historic castle as the honoured place for the investiture of Prince Edward. His name carries our thoughts back to that first royal infant who bore the honoured title, and who, it is commonly believed, was born within the walls of that renowned fortress ; and the castle itself is a witness of the conquering might of the first King Edward, who strove to make our island a United Kingdom, but only partially succeeded in the attempt.

" When the enthusiastic Welshmen and their visitors from across the Border will be assembled to do honour to the Prince of Wales they will be shown the castle gates, and be told that

there the first Prince was presented to a somewhat reluctant population. They will be conducted to the Eagle Tower, and there informed that in a small and inconvenient chamber the first Prince of Wales was born. This is the traditional story, but it is a flagrant falsification of history, a strange perversion of the actual facts which have been perfectly well known to students and scholars for the last half century. But tradition dies hard, and in spite of the investigations of historians people will continue to believe that the Eagle Tower was the birthplace of the first Prince of Wales, though there is documentary evidence that he himself built that tower, which was not completed until he had been King of England for ten years.

"We may dismiss, then, as a myth that the first Prince of Wales was born in the castle. He doubtless first saw the light in some temporary royal pavilion, perhaps erected on some portion of the site of the castle."

The question was also fully dealt with in *Notes and Queries*, 7 S. II., pp. 206 and 252, and by the Rev. C. H. Hartshorne in a paper printed in the *Archæological Journal*, Vol. VII., p. 237. The Rev. C. H. Hartshorne gave an address on the subject on the occasion of the visit of the Archæological Institute to Carnarvon Castle in 1857, in which he pointed out that the Eagle Tower (in which the Prince is supposed to have been born in 1284) was roofed in 1316 and floored in 1317.

The building of the castle was commenced by Edward I. in 1283 at the north-east corner, that is, the most distant portion of the castle from the Eagle Tower. The work proceeded towards the south-west and was completed in 1322.

On April 20, 1868, a letter appeared in the *Times* from the pen of Albert Hartshorne, son of the Rev. Hartshorne, again setting out the facts of the case.

Prof. E. Anwyl, of the University of Aberystwyth, writing on April 8, 1909, said, "I believe there is no evidence whatever that Edward II. was born *in* Carnarvon Castle."

"The newly revived legend that the first Prince of Wales—who became Edward II.—was born in Carnarvon Castle will never die, no matter how often it is killed. But the fact remains that, while the Prince was born in Carnarvon, the castle was not built at the time of that interesting event. Nearly forty years ago the Editor of *Notes and Queries* investigated the story, and his conclusion was that 'The Eagle Tower [in the castle] was not built till long after the Prince was born, and he was not created Prince of Wales until his eighteenth

year.' This ought to have settled the matter once for all, but it did not."—*Pall Mall Gazette*, April 4, 1911.

That the "Roast Beef of Old England" is of ancient origin

This estimable food, as a national one, dates only from the time of King Charles II. (1660—1685), and it then became popular probably owing to the introduction, during the previous reign, of forks which aided its consumption. Unromantic as it may appear, the Spanish Armada was defeated, not on roast beef, but on bacon, while Cromwell's 'Ironsides' and Haselrigge's 'Lobsters' were emboldened to make their gallant charges after a good feed of 'spoon-meat,' minces, stews, and made dishes, in fact the memorable feats of arms at Marston Moor and Dunbar were energised by haggis, "of whose goodness," says Mr. F. W. Hackwood in *Good Cheer: The Romance of Food and Feasting*, "it is vain to boast, because there is hardly to be found a man that does not affect them."

"The quality of food is calculated to exert a great influence upon the temperament, the health, the vigour, and the intelligence of men. There is thus some truth in Buckle's statement that the history of the most civilised nations may be explained by the chemical constituents of their food; but until the action of aliments on bodily and intellectual organisms is better known, the discussion would be premature."—Elie Reclus in *Ency. Brit.*, VIII., 617.

In Shakespeare's time it appears they thought the eating of much beef was liable to spoil their wit, for in *Twelfth Night*, I., iii., 84, Sir Andrew Aguecheek says: "*I am a great eater of beef, and I believe that does harm to my wit.*" Be that as it may, the converse does not seem true, for vegetarians have no reputation as wits! Which reminds us of the definition of a grass widow—'the wife of a dead vegetarian'!

That Caste existed in ancient Egypt

"Social ranks in Egypt were divided somewhat sharply. There was a large class of nobles, who were mostly great landed proprietors living on their estates. . . There was also a numerous official class, partly employed at the Court, partly holding Government posts throughout the country, which regarded itself as highly dignified and looked down *de haut en bas* on 'the people.' . . Further, there was a literary class, which was eminently respectable, and which

viewed with contempt those who were engaged in trade or handicrafts.

" Below these three classes and removed from them by a long interval was the mass of the population—the ' multitude,' as the Egyptians called them. These persons were engaged in manual labour of different kinds. . . .

" Still, the line of demarcation, decided as it was, might be crossed. It is an entire mistake to suppose that caste existed in Egypt. Men frequently bred up their sons to their own trade or profession, as they do in all countries, but they were not obliged to do so—there was absolutely no compulsion in the matter. The ' public schools ' of Egypt were open to all comers, and the son of the artisan sat on the same bench with the son of the noble, enjoyed the same education and had an equal opportunity of distinguishing himself. If he showed sufficient promise he was recommended to adopt the literary life ; and the literary life was the sure passport to State employment. State employment once entered upon, merit secured advancement , and thus there was, in fact, no obstacle to prevent the son of a labouring man from rising to the very highest positions in the administration of the empire. Successful ministers were usually rewarded by large grants of land from the royal domain ; and it follows that a clever youth of the labouring class might, by good conduct and ability, make his way even into the ranks of the landed aristocracy."—Prof. Geo. Rawlinson, p. 44, *Egypt*, 11th edition.

That John, the Blind King of Bohemia, was slain in the Battle of Crécy (1346) by the Black Prince

Prof. S. R. Gardiner, in his account of the battle, says, " King John himself was taken prisoner."

Prof. Cyril Ransome, says, ". . . the blind King of Bohemia, who had fallen in the fight as the ally of the French King," but he does not say by whose hand he fell.

Maunder, p. 215, *Treasury of History*, says he was slain. King John, " though very old and quite blind, would not be dissuaded from taking a personal part in the battle, but had his bridle fastened to those of two attendants, and was thus by his own order, or at least by his own act, led to perish in the thickest of the fight."

Prof. Chas. Oman. p. 188, " John, King of Bohemia, who had come to help Philip VI., though he was old and weak of sight, was also among the slain."

Harms. Ency., " Slain at Crécy."

Hence there does not appear to be much support for the idea that he was slain by the Black Prince personally.

That Christmas Trees are a very old institution and of British Origin

Like many other things used in England, Christmas trees originated in Germany, and were introduced into England so recently as the middle of the 19th century. S. T. Coleridge, writing in the *Friend*, in 1809, described with expressions of approval the use of Christmas trees at Ratzburg.

Possibly Prince Albert had some influence on their introduction into this country. They do not appear to have been in use in Germany previous to the 18th century, though the Romans used to decorate trees with lamps and gifts, but this practice had not, of course, any Christian associations.

Mr. Robert Pierpoint, writing in *Notes and Queries* of Feb. 26, 1916, p. 173, " Probably the growth of the Christmas tree in England was promoted by such books as ' Struwwelpeter ' and ' King Nut-cracker, or the Dream of Poor Reinhold,' both by Dr. Heinrich Hoffman. They made their appearance with English text about, I think, 1850. . . One may, at all events, conjecture that the Christmas was ' made in Germany,' and that Father Christmas is an English representation of Knecht Rupert. . . Like ' St. Swithin,' I do not remember anything about gifts being found in stockings when I was a child."

Vide Dean Inge in *Evening Standard*, Dec. 22, 1921.

That the Roman Steel-yard owes its origin to the Romans

The word ' Roman ' is a simple corruption of the Eastern word ' Romman,' signifying a pomegranate, the form that used occasionally to be given to the movable weight.

According to the *Concise Oxford Dic.*, the derivation of ' steel-yard ' is not from ' a rod of steel about a yard long,' but from The Steelyard, a place in London, where German merchants used to meet with their samples. The place was therefore called by them the ' sample-yard,' only they used the Low German word *staalhof*, and in translating this back into English the Low German word *staal*, meaning ' sample ' was very naturally confused with the German word *staal*, ' steel ' ; so the place came to be called ' steel yard ' instead

of 'sample yard,' and the balance used there took its name from the place.

That the Abolition of Slavery was the Cause of the American Civil War

"The difficulties between the Northern and Southern States arose over the question of the extension of slavery. As new territories became populated and converted into 'States,' a grab was made for such by the Northern and by the slave States; the latter by annexation, purchase and extension, kept pace with the former. The Northern politicians attempted to prohibit slavery in all new States, the Southern States threatened to secede: a compromise was made in effect that all States below the parallel 36° 30′ should be slave-holding. The Constitution supported slavery, and while the Northerners hated slavery they feared rupture of the Union. The compromise held for a time. The crisis arose over Kansas, about to become a State, situated above the line of compromise 36° 30′. The Southerners proposed that in future the question of slavery or no slavery should be decided by a majority of the settlers in each territory, and this passed into law. Both sides then began the race of importing settlers into Kansas, with the result that guerilla warfare broke out, the New Englanders were beaten, murdered and scalped. The North was roused, the Presidential election was won by Lincoln, who offered conciliatory terms, not himself being an abolitionist. He stood firm in the matter of extension, but he offered a guarantee that slavery should not be interfered with and that all fugitive slaves should be restored. The Southerners rejected this, and put forward an ultimatum demanding a new frontier line, and that slavery should be more clearly recognised by the central Government and firmly guaranteed. The ultimatum was declined, and the North mobilised, not to free the slaves, but to preserve the Union. This they carefully set out at the beginning of the war, and the negroes were not emancipated by the Federals—one general was reprimanded for making a proclamation doing so. Only when all hope of reconciliation was at an end did Lincoln by his own act emancipate the four million slaves."—A. Percy Allan, M.D.(Lond.).

John Drinkwater, in his play *Abraham Lincoln* (1919), correctly states the cause of the Civil War to have been not the Northerners trying to *abolish* slavery, but their objection to slavery being *extended* by the Southerners, and the threaten-

ing of the latter to secede from the Union if they were not allowed to extend slavery into other Southern States.

Lincoln, too, in his second inaugural address (1864), said, ". . . . . insurgent agents were in the city, seeking to destroy it [the Union] without war—seeking to dissolve the Union and divide the effects by negotiation. Both parties deprecated war ; but one of them would make war rather than let the nation survive, and the other would accept war rather than let it perish. . . "

" I think I should not be far wrong if I said that most Englishmen, if asked for their impressions of the struggle between North and South, would answer that it was about slavery, which the North attacked and the South defended, and then ended with the surrender of the South in 1865, followed by the emancipation of the slaves. Short as the summary is, every phrase of it contains an error. The North was not primarily concerned to attack nor the South to defend slavery.* The contest did not end in 1865, but went on for fully a decade longer. It did not end with the surrender of the South, but rather with the surrender of the North (or at least of its rulers) followed by a reconciliation based upon the concession of mutual liberty. . . Southerners as well as Northerners came to regard slavery as an evil, as an offence against Justice, and as inconsistent with the Republican idea. . .

" In 1860 this Party [the Republican] nominated Abraham Lincoln for the Presidency. He got practically no votes from the Southern States, but was nevertheless elected because the North had by this time a great numerical majority.

" His election was the signal for secession. The secession was not made in defence of slavery ; for with slavery in the slave States Lincoln had pledged himself not to inferfere, and had no power to interfere. It was made as a protest against the rule of one section by another. The Southerners knew that a united North could outvote them every time, and they conceived that if this were permitted they would no longer have any share in the government of the country. . That is why many who hated slavery (the great General Lee was among them) fought for the South in the cause of their State,

* The underlining occurs in the original.

while many who were quite indifferent to slavery fought for the North in the cause of the Union."—Cecil Chesterton, in a brief account of the photo-play *The Birth of a Nation*, by D. W. Griffith (1915).

"The Republicans' policy was against the extension of slavery, and they demanded the admission of Kansas as a free state. . . With but four exceptions the Republicans carried the Northern States and the Democrats carried the entire South. . .

"At the Presidential election of 1860, owing to a split in the Democratic camp, the Republican candidate, Abraham Lincoln, was elected, but in Congress the Republicans did not hold a majority. Immediately on the news of the election S. Carolina formally dissolved the Union, and prepared defence in case of war. By February Georgia, Alabama, Florida, Mississippi and Louisiana had followed this example of secession; and although they did not contemplate a permanent disruption, they thought they could make better terms out of the Government than in it. . . .

"Lincoln, although opposed to slavery, was at first adverse to freeing the slaves. But in September, 1862, he proclaimed that unless the seceding States returned to their allegiance by the first day of the ensuing year he would declare the slaves free."—*Harms. Ency.*, Vol. X., p. 326.

Vide *The Rebellion in America*, by B. W. Noel, M.A. (1863).

That there were Three Magi, or Wise Men, who Visited the Infant Christ

No number is mentioned in *St. Matt.* II., 1-15, but the mistake has probably originated from the fact that the Magi offered gifts, "gold and frankincense and myrrh." Nearly all pictorial representations of the incident show three 'kings'; thus perpetuating the mistake.

St. Luke's account records the visit of *shepherds* to the Child, but no number is stated, while SS. Mark and John do not mention the incident.

The *three* skulls of the Magi are among the relics, and are occasionally exhibited, in Cologne Cathedral.

That the 'Black Prince' was so called on account of the colour of his armour

"*That black name, Edward, black Prince of Wales.*"
Henry V., ii., 4.

Chamb. Ency. considers it is not proved that the above was the origin, though the *Cyclo. of Names* gives the popular derivation and so does Prof. Cyril Ransome.

Dr. Brewer (*Phrase and Fable*, p. 142), "Edward, Prince of Wales, son of Edward III. Froissart says he was 'styled black by terror of his arms.' Strutt confirms this saying, 'for his martial deeds surnamed Black the Prince' (*Antiquities*). Meyrick says there is not the slightest proof that Edward, Prince of Wales, ever wore black armour (Vol. II.); indeed we have much direct proof against the supposition. Thus Shaw (Vol. I., plate 31) gives a facsimile from a picture on the wall of St. Stephen's Chapel, Westminster, in which the Prince is clad in *gilt* armour. Stothard says, 'the effigy is of copper gilt.' In the British Museum is an illumination of Edward III. granting to his son the duchy of Aquitaine, in which both figures are represented in silver armour with gilt joints. The first mention of the term 'Black Prince' occurs in a parliamentary paper of the second year [1379]* of Richard II., so that Shakespeare has good reason for the use of the word in his tragedy of that king":—

> *"Brave Gaunt, thy father and myself*
> *Rescued the Black Prince, that young Mars of Men,*
> *From forthe ranks of many thousand French."*
>
> Richard II., ii., 3.

Timbs (*Popular Errors*, pp. 194-5) deals with the matter and states that the story "rests on no better authority than Barnes, who in his *Life of Edward III.* merely says, 'Edward the young Prince of Wales, whom from this time the French began to call *Le Neoir*, or the Black Prince,' and quotes, apparently, a certain chapter of Froissart, in which decidedly there is no mention of any such title."

"T. B. Harbottle (*Dic. of Historical Allusions*, p. 32) says, 'Black Prince, the sobriquet of Edward Prince of Wales, son of Edward III., from the black armour which he habitually wore."

Harms. Ency., "said to be called the Black Prince from the colour of the armour he wore at this battle" (Crécy).

Ency. Brit., 11th ed., Vol. VIII., p. 999, "Edward the Black Prince (1330-1376): Contemporaries called him Edward of Woodstock, and his surname of the Black Prince

* The Battle of Crécy, in which the Black Prince fought, took place on Aug. 26, 1346.

cannot be traced back earlier than the 16th century. It is supposed to have been derived from his wearing black armour."

That Eve ate an Apple in the Garden of Eden, and gave one to Adam which stuck in his throat, thus causing the first 'Adam's Apple'

There is not a word about an "apple" in *Genesis* II. and III., wherein are contained the account of the Fall.

III., 6, "And when the woman saw that the tree was good for food, and that it was a delight to the eyes, and that the tree was to be desired to make one wise, she took of the fruit thereof, and did eat; and she gave also unto her husband with her, and he did eat."

Biblical subjects were favourite ones with early painters, and in representing the episode, some kind of fruit had to be represented, and by chance an apple was chosen. Hence the fallacy. What the date is of the earliest painting representing the incident we do not know, but we have seen Albert Durer's 'Eve' in the Palace of Pitti, Florence, in which she is represented with an apple in her left hand. Durer died in 1528.

"Adam's apple. *Pomum Adami*, the prominence on the forepart of the throat formed by the anterior part of the thyroid cartilage of the larynx: so called from the notion that a piece of the forbidden fruit stuck in Adam's throat." —*Cent. Dic.*

There is of course nothing in the account in Genesis to justify the popular idea as to the origin of Adam's apple.

"Avalanche of Wit.

"A man charged at Croydon yesterday with stealing a pair of boots was said to have told a constable that a woman had 'pinched' them and given them to him.

"The Chairman (Mr. F. W. M. King): Adam and Eve again!

"Major Fox (another magistrate): She took a pair not an apple."—*Daily Mail*, Nov. 13, 1913.

That Feudalism was introduced into England by the Normans

In *Legal Lore*, 1897, edited by William Andrews, F.R.H.S., the chapter on "Law under the Feudal System" was written by Mr. Cuming Walters, in which he says:—

"It is a common error to suppose that it [feudalism] was introduced into England by the Normans. William the Conqueror only superimposed a French form of feudalism upon that which already existed; and all historians agree that the measures he adopted, the restrictions he made, and the original conditions he established, were evidence of his farseeing genius, and a masterpiece of statecraft. His was a feudalism which, while giving the lords great personal power and influence, retained them still as the servants of the King, and totally prevented them from using their strength against the throne. In this respect the feudal system in England never resembled that of Germany and France, or even that which the Norman barons established in Scotland."

That in Genesis there is only one account of the Creation, the Sacred Tree, and the Flood

At p. 483 of *Nature* for Feb. 20, 1919, 'R.C.T.' reviewed *Folk-Lore in the Old Testament*, by Sir James G. Frazer, and in it he says :—

"These three volumes should be the household companion of every religious teacher, nay, of everyone who cares or dares to see what that latest daughter of science, folk-lore, has to say about the cherished beliefs from the Old Testament, absorbed in infancy and rarely visualised differently in later life. There are plenty of Englishmen still who believe the conservatism of childhood's religious conceptions to be a virtue, and the danger to humanity of such immature conceptions, atrophied naturally by a complacent neglect, is obvious. Not many laymen, for instance, even now know that there are two widely different accounts in Genesis of the Creation, the Sacred Tree, and the Flood, welded into composite stories, and yet these stories are still believed to be a divine revelation."

"Of historical duplicates, the most celebrated are the twofold history of the Creation and the Flood, to which we must recur presently."—Prof. W. Robertson Smith, *Ency. Brit.*, Vol. III., p. 636.

Readers will also find the matter dealt with by two highly qualified theologians, to wit, W. H. Bennett, M.A., D.D., Litt.D., professor of Old Testament exegesis, of Hackney and New Colleges, London, and Walter F. Adeney, M.A., D.D., Principal of Lancashire College, Manchester, in their

illuminating little book *The Bible and Criticism* ('The Peoples' Books,' T. C. and E. C. Jack, 6d., in 1915). To quote only two sentences therefrom, they will find at p. 24: "Here again the editor sometimes placed parallel accounts of the same event side by side as separate narratives, *e.g.*, the two Creation stories, . . . thus the story of the Flood is a mosaic of sections from P. and J."

That the Angel (Gabriel) of the Annunciation held a Lily

The account of the Annunciation is given by *St. Luke* I., 26–38, and no mention is made of anything being held by the angel. Those learned in such matters tell me it should be a rod of authority if anything.

The subject has been a favourite one with artists, among those who have painted it being Tintoretto, Donatello, Botticelli, Della Robia, Burne-Jones, and Rossetti.

In the *Calendar of the Anglican Church* (1851), by J. H. Parker, we read, "In representations of the Annunciation, the Virgin Mary is shown kneeling, or seated at a table reading. The lily (*her* emblem) is usually placed between her and the angel Gabriel, who holds in one hand a sceptre surmounted by a fleur-de-lis, on a lily stalk; generally a scroll is proceeding from his mouth with the words *Ave Maria gratiâ plenâ*; and sometimes the Holy Spirit, represented as a dove, is seen descending towards the Virgin."

That the Spanish Armada was Defeated because a Great Storm Arose

Mr. C. E. Clark, p. 201, *The Mistakes We Make*, "We all know that the Armada's failure was due to a great storm, because for three centuries the failure has been thus represented. The legend struck off at the time was *Flavit Deus et Dissipati sunt.* From a religious point of view such a representation is childish, from the historical, it is false. The Spanish fleet had already sustained a crushing defeat from the English, in which many ships and men were lost, before it was overtaken by storms in the Northern seas. That fleet was, in the first place, badly commanded; in the second place, badly equipped. The best English seamen did not believe in the Spanish vessels, which were overmasted and leaking.

"As a matter of fact, by August 4th, five of the most important Spanish ships had not a drop of water, very little

food, and many sick men. It is doubtful whether 120 Spanish ships of all sizes came into the Channel, while the total number of Spanish fighting men was not more than from 10,000 to 12,000 (*Green's History* says: 'Spain had 149 ships and 28,000 men'). On the other hand, England had 197 ships and about 18,000 men (Green says: 'Only 80 ships and 9,000 men.'). The English sailors also were accustomed to the great open seas, while the Spaniards were mainly fair-weather seamen. Thus it will be seen that the defeat of the Armada was due, not to storms, still less to Divine favouritism, but to the simple fact that England had the better navy."

Vide also Mr. Hume in the *Nineteenth Century* for Sept., 1897, who supports Mr. Clark's statements as just given.

When we remember that Lord Howard of Effingham, Drake, Hawkins, and Frobisher were among those in command of the English ships, it must be admitted that we had a strong hand!

Prof. Cyril Ransome's (*A Short History of England*, p. 216), account is that the storm arose after much fighting had occurred, and the English had driven the Armada into the North Sea. Prof. S. R. Gardiner's (*Outlines of English Hist.*, p. 184) account is to the same effect, and both mention that the English sent 8 fire-ships among the Spanish fleet causing great commotion and loss. This event occurred before the storm arose. Prof. Chas. Oman (*History of England*, p. 339) gives a similar account.

That the Colossus of Rhodes stood astride the Rhodian Port and that Ships used to pass under it

FAL.—"*Hal, if thou see me down in the battle, and bestride me, so: 'tis a point of friendship.*"

PRINCE.—"*Nothing but a colossus can do thee that friendship.*"

Henry IV., 1st Part, V., i., 121.

"*Why, man, he doth bestride the narrow World,*
Like a Colussus, and we petty men
Walk under his huge legs and peep about
To find ourselves dishonourable graves."

Julius Cæsar, I., ii., 134.

Be it noted that Shakespeare did not by these words commit himself to the above errors!

The Colossus of Rhodes was one of the seven ancient wonders of the World. It was the work of Charēs of Rhodes, and represented the god Apollo. It was about 100 ft. high,

and took twelve years (B.C. 292 to 280) to erect at a cost of £70,000. *Harms. Ency.* says, "The statue stood at the entrance of the harbour, but not with one leg on each side, as is often said. An earthquake cast it to the ground in 224 B.C."

Ency. Brit. also refutes the popular idea.

Dr. Brewer, p. 275, *Phrase and Fable*, "It is said that ships could pass full sail under the legs of this statue, but the notion of a striding statue rose in the sixteenth century, and is due to Blaise de Vigenère, who was the first to give the *chef d'œuvre* of Charès this impossible position. The Comte de Caylus has demonstrated that the Apollo of Rhodes was never planted at the mouth of the Rhodian port, that it was not a striding statue, and that ships never passed under it. Neither Strabo nor Pliny makes mention of any of these things, though both describe the gigantic statue minutely."

In E. M. Sewell's *Ancient History of Egypt, Assyria, and Babylonia* (1878), p. 178, we read, "A statement has been made that its legs extended over the mouth of the harbour, but for this there is no authority."

That when Jesus was Crucified His feet as well as His hands were nailed to the Cross

> "*Over whose acres walked those blessed feet,*
> *Which fourteen hundred years ago were nailed*
> *For our advantage on the bitter cross.*"
>
> Henry IV. (1), I., i., 25.

There does not appear to be any Biblical authority for this belief, or the pictorial representations which almost invariably show the feet impaled as well as the hands. All four of the Gospels mention the crucifixion, but neither St. Matthew nor St. Mark mention the hands or feet. St. Luke does mention both, but not as being wounded, his words being (XXIV., 39 and 40), "See my hands and my feet, that it is I myself: handle me, and see; for a spirit hath not flesh and bones, as ye behold me having. And when he had said this, he showed them his hands and his feet." The object of thus calling attention to His hands and feet was clearly to satisfy the disciples as to his identity and physical body, and not its wounded state. *St. John* XX., 19, says:—"Jesus came and stood in the midst, and saith unto them, Peace be with you. And when he had said this, he showed unto them his hands and his side." v. 25, "But he [Thomas]

said unto them, except I see in his hands the prints of the nails, and put my finger into the print of the nails, and put my hand into his side, I will not believe." v. 27," Then saith he to Thomas, reach hither thy finger, and see my hands ; and reach hither thy hand, and put it into my side : and be not faithless, but believing." No mention of wounded feet ; nor do we find any other reference to such, except in the Psalms, which we suppose is an early case of poetic licence !

Canon Farrar, p. 441, *The Life of Christ*, " Then through either foot separately, or possibly through both together as they were placed one over the other, another huge nail tore its way." But he does not name the authority for his statement.

That the Ancient Egyptians used Gold for Stopping Teeth

" As to when the stopping of teeth was first introduced, there is very conflicting evidence. One widespread statement is now known to be untrue, namely, that the ancient Egyptians used gold for stopping teeth."—C. E. Wallis, M.R.C.S., L.R.C.P., L.D.S., in *Brit. Dent. Journ.*, of Mar. 15, 1915. In the discussion on the above named paper, the president (Mr. G. Northcroft) said, " Certain types of Japanese women painted their lips with gold leaf, and the ancient Royal Egyptians had the same idea carried out after death by having their teeth covered with gold leaf. At least he believed that to be so, the idea being that it was a royal mark of distinction. When such mummies were found by laymen, it was said that these teeth were filled with gold, instead of which they were simply plastered over with gold leaf."

That the Stone, Bronze, and Iron Ages represent three distinct, separate, and chronological periods in the History of Man.

The first article on *The Antiquity of Iron* by Geo. Fred. Zimmer appeared in *Cassier's Engineering Monthly* for Jan., 1915. The second and concluding article appeared in the Feb. number.

There are also three comparatively long articles in the *Harms. Ency.* under Stone Age, Bronze Age, and Iron Age. Hence it may be inferred that this is not a subject to be dealt with adequately in a few short paragraphs, and we must refer readers to the articles cited for fuller information.

At p. 20 of Zimmer's first article there is an informative diagram from which the following particulars are obtained :—

8000 B.C. to 1700 B.C., Stone weapons and implements in use. As to how much earlier than 8000 B.C. the " Stone " age started is not indicated. 8000 B.C. First knowledge of copper in Egypt, on the authority of Prof. Flinders Petrie. 6500 B.C. Oldest find of iron in Egypt (G. A. Wainwright). 3600 B.C. Relative use of Copper a maximum, and first appearance of bronze. 3000 B.C. Relative use of bronze, iron, and copper roughly in the ration of 1 to 1 to 2. 800 B.C. Bronze and iron equally in use, and copper used relatively only about one-fifth as much as either.

From the diagram it is readily seen that while the Stone Age is the earliest it by no means ended with the appearance of the metals, but continued concurrently with copper from 8000 B.C. ; with iron from 6500 B.C. ; and with bronze from 3600 B.C., down to 1700 B.C., while the copper age preceded the iron age by 1500 years, and the iron age preceded the bronze age by 2900 years.

" The term ' age,' when applied to the implements of stone, bronze, and iron, is no longer interpreted by antiquaries to denote an absolute division of time, but a condition of culture. Originally based on the assumption that the ' ages ' of stone, bronze, and iron constituted three consecutive chronological epochs, there can be no doubt that this ill-chosen terminology has led to much misconception in matters archæological. Weapons of stone are still, in the popular mind, of necessity more ancient than those of metal."—*Harms. Ency.* II., p. 319.

" The term [Iron Age] does not indicate any special period in universal chronology, as one race may be ' living in its iron age ' at the same time as other races are ' living in their stone, bone, or bronze ages.' "—*Harms. Ency.*, VI., p. 198.

That the Ancient Art of Glass-painting is completely Lost

In an old dictionary called *The Arts of Life*, by Sir Richard Phillips, we read, " The different coloured glasses owe their tints to the different metallic oxides mixed with the materials while in a state of fusion. In this manner are made those elegant *pastes* which so faithfully imitate, and not unfrequently excel, in brilliancy their originals, the gems of antiquity."

John Timbs, p. 65, *Popular Errors*, quotes the evidence of Mr. John Martin, the historical painter and whilom painter on glass, before Parliament, in which he said that " there is an ignorant opinion among people that the ancient art of glass-painting is completely lost : it is totally void of foundation, for we can carry it to a much higher pitch than the ancients, except in one particular colour, and we come very near to that. We can blend the colours and produce the effects of light and shadow, which they could not do, by harmonising and mixing the colours in such a manner, and fixing by proper enamelling and burning them, that they shall afterwards become just as permanent as those of the ancients, with the additional advantage of throwing in superior art."

The *Cent. Dic.* explains that there are two methods which are chiefly used (1) the *enamel* method and (2) the *mosaic* method. The latter uses glass which has already been coloured different colours, each piece being of one colour, and the ' picture ' being worked up by the use of these pieces. The splendid cathedral windows of the 13th century were constructed in this manner, " the beautiful colour-effects of which have thus far defied imitation, in spite of modern perfected methods." The curious thing is that it is the very perfection of the modern colouring of the separate pieces of glass which causes the resulting window to be less pleasing than the old ones. The *Cent. Dic.* goes on to say, " These admirable colour effects are now recognised to be due not only to perfection of the colours used and to their judicious juxtaposition and skilful combination with white glass to relieve them and hinder where desirable the blending of contiguous tints, but to unevenness of tone and thickness of the glass primarily due to imperfect processes of manufacture. This last quality is now imitated with artistic success, such glass in general being made by hand. . ."

". . . And age has improved it : the want of homogeneousness in the material has led to the disintegration of its surface, the soft particles in it have been dissolved away by the action of the weather, and the surface, pitted like an oyster shell, refracts the light in a way which adds greatly to the effect ; at the same time there is root hold for the lichen which (like curtains of black cobwebs) veils and gives mystery to the colour. An appreciable part of the beauty of old glass is the result of age and accident. In that respect no new glass can compare with it. There is, however, no such

thing as ' the lost secret ' of glass making. It is no secret that age mellows."

Vide an article by E. Wyndham Hulme on " Chapters on the History of Glass-Making and -Painting in England " in *The Antiquary* for Nov., 1915.

Sir Clifford Allbutt, F.R.C.P., F.R.S., at p. 81 of his *Notes on the Composition of Scientific Papers*, states :—

" Pugin's son told me his father said of glass painters, ' They say stained glass cannot be made now as fine as it was in the 13th and 14th centuries, do they ? I tell you, as fine glass can be made as ever. What they can't do is to put it together.' "

That the three white stripes on the collars of the Sailors of the Royal Navy commemorate Nelson's three great victories—the Nile, Copenhagen, and Trafalgar

' St. Swithin ' scotched this belief in *Notes and Queries* of July 1, 1916, at p. 13, taking his information from an article about the Navy which appeared in *Chambers's Journal*, April, 1916, p. 260, under the title ' Pincher Martin, O.D.' The hero " was proud of his blue jean collar with its three rows of narrow white tape, which, he had been told, commemorated Nelson's three great victories of the Nile, Copenhagen and Trafalgar. He had heard, too, that the black silk handkerchief worn round his neck and tied in front was a badge of mourning for the same great naval hero. But both in the matter of the collar and the handkerchief he had been led into following a very popular fallacy.

" The square collar was first introduced in the latter portion of the eighteenth century as a means of preventing the grease and flour with which the sailors anointed their pig-tails from soiling their clothes. The three rows of tape, moreover, were placed upon it merely for ornament, for there is no evidence to support the belief that they commemorate the three famous victories. The black silk handkerchief came in much at the same time.

" In early sea-fights the heat on the gun-decks was stifling, so much so that the men were forced to strip to the waist. To prevent the perspiration from running down into their eyes and blinding them, they were in the habit of tying handkerchiefs round their foreheads, and at ordinary times these were worn round the neck for the sake of convenience. It is true

that up till a few years ago our modern bluejackets wore their spare black silk handkerchiefs tied in a bow on the left arm when attending funerals ; but there is nothing to support the theory that they were introduced as badges of mourning for the immortal Nelson."

The sailors of the French Navy also have three white lines round their collars ; surely it cannot be suggested that they, too, commemorate the battle of the Nile and Trafalgar in which their fleets were defeated. Again, the men of the United States Navy and the Russian Navy wear the white lines, and neither of these navies had anything to do with the Nile, Copenhagen and Trafalgar ; nor does the author know of any six naval victories which could be allotted to the six lines of the two last-named navies. At Ostende, on Aug. 28, 1920, I saw about 20 men of the *E. Sao Paulo* of the Brazilian Navy, each of whom had three white stripes on his collar.

Vide *Notes and Queries*, Oct. 21, 1922, p. 323.

That history repeats itself

" The incalculable human element in all history defies invention. History does not repeat itself ; its phenomena are as unpredicted as earthquakes, not recurrent like tides or eclipses. The ages of the past are truly, in the words of Faust, a book sealed with seven seals. They can only be reconstructed by the historian after the most diligent and minute research."

" The whole science and apparatus of historical criticism has been marvellously extended during the last 100 years. This seems perhaps like the development of a destructive process ; but the casting out of error is a very necessary step in the advancement of truth."—Silvanus P. Thompson, D.Sc., F.R.S., pp. 39 and 40, *The Quest of Truth*.

That Napoleon's losses in his Russian campaign were chiefly due to the Russians laying waste the country, and to excessively cold weather

" Contrary to popular tradition, Napoleon's defeat in his final Russian campaign was due neither to the wasting of the country with fire and sword by the Russians as they retreated nor yet to ' General January ' or ' General February.' For in spite of all the snow-scene pictures which have been painted of the great retreat, remnants of his army came back across

the Beresina early in November before the winter had set in. The real enemy that mowed down his magnificent army was spotted typhus, which raged through its ranks like a forest fire."—Woods Hutchinson, M.A., M.D., p. 6, *The Doctor in War.*

That the Bishops of the Church of England are the Direct Descendants of the Apostles

This is known as "Apostolic Succession." The author is much indebted to Miss Steele-Hutton, M.A., who has kindly taken so much trouble with the question, and prefaces her remarks with the Sydney Smith story on the subject :—

Sydney Smith, on being asked if he believed in Apostolic Succession, said he certainly did, as there was no other way of explaining the direct descent of the Bishop of Exeter (of his time) from Judas Iscariot !

"This theory that the Episcopal organisation was instituted by the Apostles (some say by Christ and the Apostles in the forty days between the Resurrection and Ascension) rests on the evidence of :—

(1) The Ignatian epistles (A.D. 104-117).

(2) The Writings of Irenæus (A.D. 140-202).

[*Vide* Ante-Nicene Christian Library, Vols. V. and IX.]

"There are fifteen epistles which bear the name of Ignatius, but Eusebius mentions only seven (*Hist. Eccl.*, III., 36). These seven each have a long and a short form, and scholars 'have for the most part agreed' to accept the short form in the Greek version as genuine."—[*Vide* Ante-Nicene Christian Library, Vol. I., p. 139.]

"In 1644, Usher rejected those not mentioned by Eusebius, and just then a Medicean MS. was published, giving the seven mentioned by Eusebius in the short form (for the first time of publication). In 1845 the British Museum published the Syriac version of three letters. There is now much doubt as to which are genuine. The seven of Eusebius in the short form are considered usually as genuine. If so, this points to the establishment of episcopacy in the second century, since Ignatius speaks of it as existing. But the letters mention other details of service and organisation which we believe to be of later origin. Therefore, many consider these letters as of a much later day. But in any case they *do not claim* that episcopacy originated with the Apostles.

" Irenæus has the fully developed idea that all the existing rites, dogmas, and organisations of the Church were arranged by the Apostles."

That Claverhouse, Viscount Dundee, had an old woman and a young girl (Margaret Maclachlan and Margaret Wilson) tied to stakes at low tide and then left them to perish by a lingering death at Wigtown

Sir Herbert Maxwell answered, in *Notes and Queries* 12 S. i. 354, April 29, 1916, the author's question on the above matter. The reply is as follows :—

" Claverhouse (12 S. i. 169, 293).—It is not surprising that the odium attached to a penal code of atrocious severity should come to be focused upon Claverhouse, whose duty it was to administer justice according to that code in his sheriffdom of Wigtown. I am not concerned to defend his memory here and now ; but in regard to his personal responsibility for the execution by drowning of the ' Wigtown Martyrs '—Margaret Maclachlan and Margaret Wilson—it is but fair to take into account, not only the circumstances of this particular case, but also the fate of a multitude of other innocent women who were tortured and executed as witches about this period, and in the same district, without the slightest protest upon the part of the public. The tragedy on Wigtown Sands in 1685 positively pales before the horror of innumerable others enacted on the shores of Solway. I shall cite but two examples.

" On April 2, 1659, ten women were tried for witchcraft before two judges at Dumfries. Nine were pronounced guilty and condemned to death. The verdict on the tenth was ' not proven ' ; nevertheless she was sentenced to be banished from the parish. Eight ministers were appointed by the Presbytery to

> ' attend the nine witches, and that they take their own convenient opportunity to confer with them ; also that they be assisting to the brethren of Dumfries and Galloway the day of the execution.'

" The victims of this inhuman law were taken to the public place of execution in Dumfries, bound to stakes, strangled, and burnt to ashes.

" Again, in 1698, ten years after the glorious Revolution, Elspeth M'Ewen was charged before the kirk-session of

Dalry with having 'a pin in her kipplefoot' (*i.e.*, in the end of a rafter in her house) by means whereof she could draw milk from the cows of her neighbours. She could also interfere with the supply of eggs from their poultry. One damning piece of evidence against her was that the minister's horse, which was sent to bring her up for trial, trembled when she mounted and sweated drops of blood! Poor Elspeth stood no chance after that; she was convicted as a witch and sent to prison at Kirkcudbright, where she was made to suffer such torture that she prayed to be put to death. Nothing could be simpler; she had but to confess her guilt, which she did, and forthwith the helpless woman was burnt to death, no doubt with ministers of religion 'assisting.'

"No multitude of blacks will make one white, nor does the frequency of judicial butcheries like these palliate the hideous injustice of the doom of the 'conscientious objectors' at Wigtown; but it modifies the *relative* iniquity thereof. Not upon Claverhouse and other officers, whose duty it was to administer the law, should the chief obloquy be laid, but upon the king who sanctioned—the ministers who devised—the Parliament that enacted—the Church that promoted—these fiendish statutes.

"HERBERT MAXWELL.

"Monreith."

Another correspondent wrote direct to the author on Feb. 29, 1916, saying, "Claverhouse had nothing to do with the so-called Wigtown Martyrs. The fact of the martyrdom even is open to doubt. See an article in *Blackwood*, Dec., 1863. Charles Kingsley in *Alton Locke* has an allusion to it, but history was not C.K.'s forte. Macaulay appears to have been misled by the fact that Claverhouse's brother, David Graham, was present at the trial of the women. See a careful and impartial discussion of the whole question in *Claverhouse* by Mowbray Morris (Longmans, 1887)."

Mr. J. Willcock also wrote direct on Mar. 27, 1916, "Claverhouse was not involved in the execution of these women. No one has ever denied the fact of trial and sentence in the case of these martyrs: but fifty years ago an attempt was made to deny the fact of execution. The truth of the story, however, has been abundantly vindicated. The evidence is splendidly arranged in a volume by Dr. Stewart entitled *History Vindicated in the Case of the Wigtown Martyrs.*"

H. R. Allport, *Casual Club Papers*, 1st Series, p. 89. "His death in the arms of victory at Killiecrankie blazed his fame throughout Europe, made him the idol of the Jacobite cause, and aroused to fiercer fervour the wrath and hatred of the Covenanters. The legend of his power and of his wickedness grew apace; stories, the more monstrous and the more incredible the better, were eagerly circulated; and deeds were laid at his door with which he had no more connection than with the execution of Charles the First, or with the battle of Waterloo.

"I myself, for example, grew up in the belief that Claverhouse was more or less responsible for the worst atrocity of the period, when an old woman and a young girl were tied to stakes at low water, and left to perish by a lingering death. It is now established beyond the reach of doubt that he had absolutely no hand in the matter. He was in disgrace with the Court; he had been suspended from all his employments; and he was living in retirement in a remote part of the country."

That Cleopatra dissolved a pearl in vinegar and drank it to the health of Mark Antony

The author's question in *Notes and Queries* (12 S. I., 128) elicited several replies of which those by "St. Swithin" and Robt. Pierpoint (12 S. II., 37, July 8, 1916) were the fullest. The following is that by "St. Swithin" which appears at p. 198 of the issue of March 4, 1916:—

Cleopatra and the Pearl (12 S. i. 128).—From the "Life of George Hartley," by Mrs. Alec Tweedie, we learn that this careful investigator doubted the well-quoted story of Cleopatra's costly draught. He recorded the following interesting facts:—

"Shell-fish pearls are not nearly so easily dissolved in strong vinegar as the interesting tale of Cleopatra having taken a large pearl from her ear, and after having dissolved it in vinegar drunk it to the health of her lover Antony, would lead us to believe; for during our experiments we have learned that not only does it take many days to dissolve out the mineral constituents of a large pearl in cool vinegar, but that it even requires several hours to extract the mineral matter by boiling vinegar, from a pearl no bigger than a garden pea. While in neither case, moreover, can the pearl be then made to disappear, as from the fact of the organic

matrix of a pearl being wholly insoluble in vinegar, even after every particle of the earthy substance has been removed it still remains in the same shape, bulk, and almost identical appearance as before. Hence we fear that if the Cleopatra legend is to be believed at all, it requires considerable modifications ere it can be brought into harmony with scientific truth. There is indeed only one way in which a large pearl, such as that which Cleopatra is said to have employed, could be dissolved in vinegar at a supper table, and that is by having it completely pulverised by a hard hammer and a strong arm before applying the vinegar to it. For, once the mineral constituents of a pearl have been reduced to the state of an impalpable powder, they not only readily dissolve, but effervesce like a seidlitz-powder—though much less strongly —when brought into contact with strong vinegar, and thus, on their being diluted with water, may be transformed into what might be called a cooling lover's potion."—From an article quoted pp. 303, 304.

ST. SWITHIN.

Mr. Robert Pierpoint ends his contribution with the apt remark, " If we are to believe that Cleopatra drank a cup of acid capable of dissolving a real pearl, we may ask ourselves whether she could have done so without disastrous effect on herself."

John Timbs, F.S.A., p. 87, *Things Not Generally Known*, First Series (1860), says, " . . . the account of Cleopatra dissolving a pearl in vinegar and drinking it to Mark Antony's health at supper is now regarded as an historical fiction."

That Cleopatra killed herself by applying an asp to her bosom

Plutarch appears to be responsible for the story, but he is most cautious and certainly does not give it as a fact. On the contrary, he gives several other versions of how she may have killed herself.

We quote from Volume II. of the *International Library of Famous Literature*, p. 912, which is by Plutarch :—" Some relate that an asp was brought in amongst those figs . . . Others say it [the asp] was kept in a vase, and that she vexed and pricked it with a golden spindle till it seized her arm. But what really took place is known to no one. Since it was also said that she carried poison in a hollow bodkin, about which she wound her hair ; yet there

was not so much as a spot found, or any symptom of poison upon her body, nor was the asp seen within the monument; . . . Some relate that two faint puncture marks were found on Cleopatra's arm, and to this account Cæsar seems to have given credit; . . . Such are the various accounts."

The Cyclo. of Names quotes thus from Rawlinson's *Herod*, II., 123, note :—" If Cleopatra's death had been caused by any serpent, the small viper would rather have been chosen than the large asp; but the story is disproved by her having decked herself in 'the royal ornaments,' and being found dead 'without any mark of suspicion of poison on her body. Death from a serpent's bite could not have been mistaken; and her vanity would not have allowed her to choose one which would have disfigured her in so frightful a manner."

Shakespeare, as might be expected, adopts the popular story and refers to its incidents several times between lines 242 and 345 of *Antony and Cleopatra*, V., ii.

Rawlinson says :—" Nor is the statue carried in Augustus' triumph which had an asp upon it any proof of his belief in it, since that snake was the emblem of Egyptian royalty; the statue (or the crown) of Cleopatra could not have been without one, and this was probably the origin of the whole story."

Sir Thomas Browne devotes Chap. XII. of his Fifth Book of *Vulgar Errors* to this subject, and his editor, Simon Wilkin, received a long letter on the matter from R.R. Reinagle, which is printed as a note.

That the Germans were the originators of the use of liquid fire in warfare

" To the parallels between the wars of to-day and those of the ancients, recently pointed out in this journal, may be added the curious revival of the old Greek Fire in the German flame-thrower. There are differences, no doubt, but the principle is the same. The Greek Fire was invented in the year A.D. 668 by Callinicus of Heliopolis, and was for hundreds of years a closely-guarded secret among the Romans of the East. It is minutely described by Gibbon. A composition of naphtha, sulphur and pitch was used.

" It was employed with equal effect by sea and land, in battles or in sieges. It was poured from the rampart in large boilers. Sometimes it was deposited in fire-ships,

and was most commonly blown through long tubes of copper, which were planted on the prow of a galley, and fancifully shaped into the mouths of savage monsters.

"The use of this instrument of attack declined after the introduction of gunpowder."—*T.P.'s Weekly*, Sept. 25, 1915, p. 296.

"GREEK FIRE.—A composition of nitre, sulphur, and naphtha. Tow steeped in the mixture was hurled in a blazing state through tubes, or tied to arrows. The invention is ascribed to Callinicus, of Heliopolis, A.D. 668.

"A very similar projectile was used by the Federals in the great American contest, especially at the siege of Charlestown."—Dr. E. Cobham Brewer, *Phrase and Fable*, p. 550.

"Greek fire has borne the names wild fire, maritime fire, wet fire, fire-rain; called by the French *feu grégeois*, by the Germans *griechisches Feuer*; it was 'the oil of cruel fire' of the Chinese, the *oleum incendiarum* of the Romans, and the πῦρ ὑγρόν, liquid fire, of the Greeks. . . . it was poured from cauldrons and ladles on the besiegers and their engines, or vomited through long copper tubes from the mouths of hideous figures set in the prows of ships. . . . Liquid fire has been used in warfare from very remote times, as may be seen in the Assyrian bas-reliefs in the British Museum. . . . Of all the spontaneously combustible liquids, Bunsen's Kakodyl, $As_2 (CH_3)_4$, is probably the most deadly, while it is far in advance of the old Greek fire as a destroyer of life."—*Ency. Brit.*, Vol. II., p. 159.

That the Order of the Garter was originated in connection with the Countess of Salisbury accidently dropping one of her garters at a State Ball

If when this and other *traditions* are related it were made clear that they are traditions and not facts of history, little harm would be done, but the author has never heard the slightest doubt expressed about how and when the Order was instituted when the above alleged origin has on all occasions, in his hearing, been given, and it was not till May 22, 1915, that he learned the position of affairs from an article on "The Garter" in *T.P.'s Weekly* of that date. This article states that ". . . wearing the garter of a pretty maiden on the hat or knee was a common custom of our forefathers. So much so that brides wore on their legs a

number of gay ribbons that were distributed among friends after the ceremony, and the musicians always tied the bride's ribbons to their harps, pipes, etc."

On reading the article " Knighthood " in *Ency. Brit.*, Vol. 14, p. 122, we find that historians are not even sure at what date between 1344 and 1351 the order was instituted. It goes on to say, " Regarding the occasion there has been almost as much controversy as regarding the date of its foundation. The ' vulgar and more general story,' as Ashmole calls it, is that of the Countess of Salisbury's garter. But commentators are not at one as to which Countess of Salisbury was the heroine of the adventure, . . . while Heylyn rejects the legend as ' a vain and idle romance derogatory both to the founder and the order, first published by Polydor Virgil, a stranger to the affairs of England, and by him taken upon no better ground than *fama vulgi*, the tradition of the common people, too trifling a foundation for so great a building,' and Anstis says that ' it is now no more credited than the absurd, ridiculous relation of Micheli Marquez . . ,, ; or the whimsical dream of Mr. Joshua Barnes . . . " The same article quotes from *Orders of Knighthood*, Vol. I., p. lxxxiii., by Sir Harris Nicolas, who thinks ' nothing is more likely ' to have been the origin than the usual traditional one.

Polydore Virgil was an Italian whose period was about 1470 to 1555. Supposing him to have been no more than 20 when this legend was ' first published,' we have the fact that the story was not recorded till about 140 years after the alleged event. This is a common characteristic of ' embellishments ' of this sort which certainly does not add to one's confidence in their accuracy. It must be remembered that a ' good ' raconteur usually dresses the stories he hears with additions of his own, but while the ' dressed ' version may make a better story it is *his* story and not history !

That the Submarine is a modern invention

The facts of this case illustrate the difficulties of an inventor when he thinks he has originated something worth patenting. If his invention has been anticipated by anyone else, his patent will be void and his money lost.

In Bacon's *Novum Organum*, p. 300 (Book II.), we find, " We hear that some sort of Boat or Vessel has now been

invented, capable of carrying men some distance under Water." *Novum Organum* was first published in 1620!

As a result of the author publishing this quotation in *Notes and Queries*, Mr. Kumagusu Minakata sent a long contribution which was published at p. 112 of *Notes and Queries* of April, 1918. In this he referred to *Ency. Brit.*, 11th ed., Vol. XXIV., p. 917, in which it is stated that the first undoubted success with a submarine vessel was achieved by Bushnell in America in 1775.

That London Bridge was at one time known as Trafalgar Bridge, or that it was proposed so to name it

The following note is from *Notes and Queries*, of July 31, 1915, p. 83 :—

"TRAFALGAR BRIDGE.

"Readers of *Notes and Queries* may possibly remember that inquiries have been made from time to time as to the origin of the belief that London Bridge was at one time named, or proposed to be named, Trafalgar Bridge. At 9 S. i. 188, Mr. C. E. Clark claimed to have knowledge that this renaming actually took place, but he produced no evidence at the time to support his statement, and the query has remained hitherto unanswered. In the absence of any more definite information, the following extract from the catalogue of the Royal Academy Exhibition of 1817 may be of some interest, and may possibly supply an answer to the question :—

"'MODEL GALLERY.

"'1010. Design for the iron intended East London or Bridge of Trafalgar from St. Paul's, Shadwell, Middlesex, over the River Thames, to St. Mary, Rotherhithe, "Surry," of sufficient altitude for shipping to sail beneath. Designed on the principles of tenacity or tension ; the three apertures over the river to be 320 ft. chord each, the incline of plane on each shore 1,200 ft. ; the various niches of the bridge meant for the reception of bronze statues of those naval heroes who have most distinguished themselves in the service of their country, and in the "pannels" beneath them, metal bas reliefs of our principal naval engagements. R. DODD.'

"In 1820, Ralph Dodd was advocating the building of a new London Bridge of iron on his 'principles of tenacity.' Like the idea of 1817, the scheme fell through, but it is possible

that the name ' Trafalgar Bridge ' was remembered by the public long after the design to which it was attached was forgotten. In 1824, when the new London Bridge was commenced, the name may have been revived, but of this there is no evidence at present available.

" Guildhall Library. J. L. D."

That the place of Confinement in Austria of Richard I. was discovered by his favourite minstrel, Blondel

Poets and painters are probably more to blame than other classes for the perpetuation of erroneous information. In this case it is an artist, for the author learns from Miss Margaret Hepburn that when she visited, on July 4, 1915, the studio of the late G. F. Watts at Compton, among the pictures which she saw there was " a fine painting of Blondel in a listening attitude outside a Castle."

There seems to be no doubt that Richard was taken prisoner by Leopold, Duke of Austria, in 1192, and was put into the Castle of Dürrenstein on the Danube, but the Blondel legend was not started till the next century as the following quotations show :—

Harms. Ency., under ' Blondel,' " The earliest trace of this legend occurs in the *Chronicle of Rheims* (13th century) ; no mention of it is found in Blondel's (Blondain's) acknowledged poems (Vol. XIX. of Tarbe's ed. *Collection des Poètes Champenois*, Rheims, 1862)."

" Legend was already rife about him, but the story of his discovery by Blondel only dates from the following century, and is of French origin."—*Ency. Brit.*, XX., 540.

" The story is given by Fauchet on the authority of some old French chronicle and furnished the subject of an opera by Gretry. Its truth, however, is doubted."—Knight's *Cyclo. of Biog.*

Mr. C. E. Clark, p. 182, *Mistakes WE Make*, also refutes it.

Several quotations were given in *Notes and Queries* of Nov., 1918, p. 303 ; Jan., 1919 (at p. 21) ; and Mar., 1919 (at p. 77), but none even mentions the legend, though they show some doubt as to which castle it was.

Other references to *Notes and Queries sub* ' Richard Cœur de Lion ' are Oct. 29, p. 353 ; Nov. 12, p. 398, and Dec. 24, p. 514, all of 1921.

That Absalom, son of David, was killed by his long hair catching on the bough of an oak-tree and thus suspending him therefrom

We appear to be indebted to imaginative artists for this fallacy. The author well remembers seeing, in his childhood, a picture of Absalom hanging by his hair to a bough, and Mr. C. E. Clark, p. 143, *More Mistakes We Make*, refers to such erroneous pictorial representations of this alleged happening. The curious thing is that on reference to the Bible there does not seem to be the slightest justification for saying, or representing, that he was caught by the *hair* II. *Samuel* XVIII., 9, tells us plainly, " . . . his head caught hold of the oak, and he was taken up between the heaven and the earth ; and the mule that was under him went on."

Mr. Clark suggests that his " neck was jammed between the narrow forks of an oak bough." This the author agrees is a much more likely thing to have happened.

Even *Ency. Brit., sub* ' Absalom ' says by the hair ! But *Harms. Ency.* says by the head. Vide *Notes and Queries*, April 21, 1923, p. 311.

That King Arthur of England was a real person

There were in 1907 a number of fine bronze statues of various kings in the High Church at Innsbruck, and what was said to be the finest of these was of King Arthur of England, but for all this we find the following at p. 13 of Prof. Charles Oman's *History of England* (1905) : ". . . Arthur, the legendary chief under whom the Britons are said to have turned back the Saxon invaders for a time, was—if he ever existed—the bearer of a Roman name, a corruption of Artorius. But Arthur's name and exploits are only found in romantic tales ; the few historians of the time have no mention of him."

Bacon also discredits Arthur's real existence in his *Novum Organum*, Book the First, § LXXXVII. ; and the *Cyclo. of Names* speaks of " Arthurian legend."

Vide also the P.F. *re* Knights of the Round Table.

That the Atomic Theory is not more than about a century old

Sir Francis Bacon in his *History of Wind*, pp. 303 and 307, quite plainly states the atomic theory, while at p. 124 of his *Novum Organum* he has this footnote :—

" The theory of the *Epicureans* and others. The Atoms are supposed to be indivisible, inalterable Particles, endued with all the properties of the given Body, and forming that body by their union." *Novum Organum* was first published in 1620.

The expression " John Dalton's Atomic Theory " is not uncommonly heard, but on reference to the *Harm. Ency.* it will be found that " John Dalton, in the first decade of the 19th century, revived the idea of atoms, which was first taught by the ancient Greek philosophers, 400 B.C."

That Moses wrote the Pentateuch ; David, the Psalms ; Solomon, Proverbs, Canticles, and Ecclesiastes ; and Daniel, the book bearing his name

A most informative, though small, book (94 pp.) is one of The People's Books, entitled *The Bible and Criticism*, by Dr. W. H. Bennett, M.A., D.D., Litt.D., Professor of Old Testament Exegesis at Hackney College, London, and Dr. Walter F. Adeney, M.A., D.D., Principal of Lancashire College, Manchester. At p. 11 thereof we read, " This summary would run somewhat as follows : Moses did not write the Pentateuch ; David did not write the Psalms ; Solomon did not write *Proverbs*, *Canticles* or *Ecclesiastes ;* the Book of Isaiah was not wholly written by Isaiah, chapters xl.-lxvi. being written by a ' second Isaiah ' ; Daniel did not write *Daniel ;* the ' second Isaiah ' and the books once ascribed to Moses, David, Solomon, and Daniel were composed long after the times when those worthies lived."

p. 25, " There is no absolute proof that any part of the Pentateuch comes to us from Moses, but it is quite possible some sections may be based on material which either originated with him or received his sanction."

p. 41, " Nor can any of the psalms in the Psalter be ascribed with any probability to David."

p. 44, " The apocryphal *Wisdom of Solomon*, often spoken of as *Wisdom*, is occupied with the subject from which it is named. It has, of course, no connection with Solomon, but was composed probably some time in the first century B.C."

See also Robertson Smith's article on the " Bible " in the 9th ed. of *Ency. Brit.*, published in 1876. For this article he was expelled in 1881 from the professorial chair at Aberdeen, though now its teachings are accepted by advanced Biblical scholars like Drs. Bennett and Adeney !

That the earliest extant MSS. of the Old Testament are several thousands of years old

"There is no express evidence as to how the traditional views arose. All that we know is that we find the titles in the earliest extant manuscripts [of the Old Testament], which however, were not written till from three to eight centuries *after* Christ, and that we find these titles in use in the New Testament and other literature of the same period."—*The Bible and Criticism*, by Dr. W. H. Bennett, M.A., D.D., Litt.D., and Dr. Walter A. Adeney, M.A., D.D.

That the earliest extant MSS. of the New Testament date from the time of Jesus Christ

The article by Dr. Walter F. Adeney, M.A., D.D., on the New Testament in *The Bible and Criticism*, by D. W. H. Bennett, M.A., D.D., Litt.D., and Dr. Adeney, has at p. 53, "A clever printer, by putting the term '*Textus Receptus*' on the title-page of his edition of the Greek Testament did much to secure a measure of fixity, if not of sanctity, for his form of the text." There was, of course no justification for his calling his version the 'accepted text,' but he realised only to well it would be 'a good selling proposition' so to call it, and so the deed was done. Dr. Adeney goes on to say of the *Textus Receptus* edition, "This was virtually a re-issue of Stephens' text which had been in the main that on which our Authorised Version of the New Testament had been founded, and which had closely followed Erasmus, who was the first to publish a printed copy of the New Testament. Now, Erasmus had only two Greek manuscripts to work on, and the oldest of these had been written in the tenth century of the Christian era. Neither of them was perfect. But Erasmus' publisher was so eager to have the edition pushed on in order to be out before the rival production [how modern!—ED.], Cardinal Ximenes' polyglot, that Erasmus retranslated out of his Latin version the passages necessary to fill up the lacunæ."

". . . Origen, writing before A.D. 250, had occasion to study difficult questions of textual criticism. Plainly, then, it is not enough to go back merely to our oldest manuscripts, since they are to be dated a century later than his time." Thus the oldest MSS. of the New Testament date from A.D. 350.

Apart from the present existence of early MSS. of the New Testament, we find much that is not generally realised on this subject in the article "Canon," by Dr. S. Davidson, D.D.,

Ency. Brit., Vol. V., p. 7 *et seq.*, from which the following are excerpt: "No New Testament canon, except a partial unauthoritative one, existed till the latter half of the 2nd century." . . .

"The exact principles that guided the formation of a canon in the earliest centuries cannot be discovered. Definite grounds for the reception or rejection of books were not very clearly apprehended. The choice was determined by various circumstances of which apostolic origin was the chief, though this itself was insufficiently attested, for, if it be asked whether all the New Testament writings proceeded from the authors whose names they bear, criticism, cannot reply in the affirmative."

"When it is asked to whom do we owe the canon? the usual answer is, to the Church, which is hardly correct." . .

"The circumstances in which the collection originated were unfavourable to the authenticity of its materials, for tradition had been busy over them and their authors."

That Cincinnatus left his plough on being informed by the messenger from Rome that he had been made dictator

Dr. Brewer, p. 254, *Phrase and Fable*, "Cincinnatus, the Roman, was ploughing his field when he was saluted as Dictator."

The *Harm. Ency.* (1906), Vol. III., 122, "One of the old Roman heroes of the early legendary days of the republic. In 458 B.C. he was called from ploughing his land, as the story goes, to become dictator."

Cyclo. of Names (1905), "A Roman legendary hero . . . he was named dictator by the Senate, whose deputies, despatched to inform him of his appointment, found him digging in the field on his farm beyond the Tiber. . . The details of his story vary."

Ency. Brit., Vol. V., 784, "Cincinnatus, the hero of one of the early Roman legends, was born about 519 B.C. According to the story, he was ruined by the fine which was imposed on his son."

That Clocks and the Compass were invented in Germany

The earliest references to the compass occur in Chinese history in the year 2634 B.C., when Germany was not!

Dr. Herbert Chatley, D.Sc.(Engineering), disputes that the Chinese invented the mariner's compass.

As to the history of clocks, *Ency. Brit.* says it is involved in great obscurity, but concludes that genuine clocks of the wheel type existed in the 12th century. Earlier than these were water clocks and sand glasses, while King Alfred of England used to burn graduated candles to indicate the time. Beckmann's *History of Inventions* (1846) has a long article on clocks and watches, being a paper by Prof. Hamberger read before the Society of Göttingen in 1758, in which the latter says, " I think it is sufficiently apparent that clocks moved by wheels and weights began certainly to be used in the monasteries in Europe about the eleventh century. I do not, however, think that Europe is entitled to the honour of this invention ; but that it is rather to be ascribed to the Saracens, to whom we are indebted for most of the mathematical sciences."

It is also fairly evident that Germany early and successfully took up their manufacture.

That the Dauphin, son of Louis XVI. of France and Queen Marie Antoinette, was murdered in the Temple prison by his gaoler Simon and his Wife

Dr. Charles C. Bombaugh, A.M., M.D., devotes pp. 425-7 of his *Facts and Fancies for the Curious* (1905) to this subject, which begin thus : " The story . . . has long since been exploded. It has been definitely established on the most incontrovertible evidence that the Dauphin did not die in the Temple at the hands of the Simons. The latter were not ignorant brutes, but well-to-do people, Simon being a member of the ' Conseil Générale ' of the Seine. . . There is abundant evidence to show that the Prince escaped, and that several members of the Royalist party were concerned in his flight."

That Eadgar, King of Britain, was rowed on the river Dee by eight vassal Kings

There is some doubt about the story as a whole, but the part which is certainly wrong is in regard to the number of royal oarsmen. They were *six*, as we learn from Prof. Chas. Oman, p. 49, *History of England*, " The story is well known how he made his six chief vassals—the Kings of Scotland, Cumbria, Man, and three Welsh chiefs—row him across the

Dee, and then exclaimed that those who followed him might now in truth call themselves Kings of Britain."

Mr. C. E. Clark, p. 67, *More Mistakes we Make*, " according to Mr. Lang, who cites the English chronicle, the tributary kings were six, the number being raised to eight two centuries later by Florence of Worcester." This sounds like a case of feminine exaggeration, so we are glad to inform our gallant readers that this Florence was a *man !*

Prof. S. R. Gardiner, p. 23, *History*, states, " He is said to have been rowed by eight kings on the River Dee." While *Ency. Brit.* VIII., 286, " The well known picture of the *basileus* of Britain rowed by eight vassal kings on the Dee, even if some of its details may be legendary, at least sets before us the popular conception of the dominion of Eadgar the Peaceful."

That the signal for the death of a vanquished gladiator was the turning down of the thumbs of the audience

The Rev. Dr. Brewer, p. 253, *Guide to Roman History*, " Were these combatants ever killed ? That was left entirely to the spectators. If they wished the conquered gladiator to be killed, they held their thumbs upwards ; but if they wished him to be spared they turned them down."

Mr. C. E. Clark calls attention to this error at p. 118, *More Mistakes We Make*, and refers especially to the many books of reference which are wrong, and also to two pictures, Gérome's *Pollice verso*, and *The Signal of Death* which was in the Royal Academy in 1898, which are also wrong as regards the position of the thumbs.

At p. 230 of Vol. V. of the *Harm. Ency.* we find, " . . if the spectators wished his life to be spared they turned their thumbs down, but if they desired his death they turned them up."

That Macbeth killed Duncan in his (Macbeth's) house

Shakespeare's play *Macbeth* certainly implies that the murder took place in Macbeth's castle. Act II. sc. i. is described as " Court of Macbeth's castle." Sc. ii. as " The same," and lines 85 and 86 of II. iii. are " O Banquo ! Banquo ! our royal master's murdered ! " To which Lady Macbeth replies, " Woe, alas ! what, in our house ? "

Ency. Brit., XV., 130, has, " Macbeth's predecessor on the throne was Duncan, son of Crinan, and grandson of Malcolm,

whom he slew (according to some accounts at ' Bothgowan,' said to have been near Elgin)." While Vol. XXI., p. 480, has ". . . Duncan himself was killed at Bothgownan, near Elgin, by Macbeth, his own general."

Chamb. Ency., VI., 765, " Macbeth . . . In 1040 he slew Duncan, King of Scotia, near Elgin, and succeeded him on the throne."

Brewer's *Readers' Handbook* (1898), " Macbeth did not murder Duncan in the castle of Inverness, as stated in the play, but at ' the Smith's house,' near Elgin (1039)."

Ency. Brit., XV., 130, " It is most probable that Shakespeare's only source for the tragedy of *Macbeth* was the *Chronicles* of Holinshed (derived from John of Fordun and Hector Boece)."

That the story of the Pied Piper of Hamlin is true

Mr. C. E. Clark, p. 38, *More Mistakes We Make*, ". . . the Rev. S. Baring-Gould* traces the Pied Piper back to Apollo, to Orpheus, to old Sanskrit legends, and thinks him the embodiment of a wind-legend and as cosmopolitan as the wind itself. . . Coldly enough, then, we are to think of the Pied Piper merely as the survival of a prehistoric myth, typifying that shrillest piper of all—the whistling wind." We may remark, too, that all the alleged trouble arose through the non-payment for the services said to have been rendered, *i.e.*, because he was not a pied (paid) piper !

Ency. Brit., XI., 409, says, " Hameln is famed as the scene of the myth of the piper of Hameln. . . Some trace the origin of the legend to the ' Child Crusade,' or to an abduction of children."

The story is the subject of a poem by Robert Browning and also one by Julius Wolff (3rd ed., 1876).

The *Cyclo. of Names* treats it as a legend, saying that " it was long regarded as historical," and that Brandenburg, Lorch, and other towns have a similar tradition ; and that there are Chinese and Persian legends much resembling it.

The date of the alleged happening is given by the *Cyclo. of Names* as 1284, while Brewer, *Phrase and Fable*, gives it as *July 22*, 1376 !

Sir Sydney Russell-Wells, M.D., F.R.C.P., says the story is probably allegorical, and that it refers to the plague. Pied=

* *Curious Myths of the Middle Ages*, 2nd Series, 1868.

spotted. Attacked first the rats, and then the children, and disappeared over the hills. Someone else confirmed this, whose name has escaped me.

That pipes for smoking were unknown in Great Britain before Columbus discovered the island of Tobago in 1498

The smoking of tobacco was practised in the New World before it was discovered by Europeans who previously had not smoked *tobacco*, "but pipes of iron, bronze, and clay have been so frequently found associated with Roman remains and other antiquities as to lead many authorities to maintain that such pipes must have been anciently used for burning incense or for smoking aromatic herbs or hemp."—*Ency. Brit.*, XIX., 111.

That Pisistratus ordered an official recension of Homer's poems

H. J. W. Tillyard, M.A., p. 15, *Greek Literature*, "Solon (600 B.C.) is said to have passed a law to regulate public recitations at Athens, and the Athenian tyrant Pisistratus (550-527 B.C.) is credited with having ordered an official recension of the poems. Although this recension is now held to be a fiction, the fact remains that Athens took epics under a kind of protection."

That there once was a female Pope, known as Pope Joan

She is (or was) supposed to have reigned about 855-858 as Pope John VIII.

Of many amazing fictions this is certainly not the least. *Ency. Brit.*, XIII., 695, says, ". . . now regarded as a fictitious personage. . . . the story was received as fact from the 13th to the 15th century, but it has been discredited by later researches."

Dr. Döllinger is the one who has gone most fully into the story. She was first mentioned by Stephen de Bourbon, who died in 1261, *i.e., only about 400 years after the alleged event*, such a tardy interpolation being a common feature of stories of this worthless character, as readers of this book will find elsewhere.

That the art of Printing was invented in Germany

Many things which it used to be thought were invented in Europe have since been found to date hundreds of years

before and to have been originated in China. So it was with artillery and printing. On referring to *Ency. Brit.*, V., 662, we find, " . . . the close of the 6th century, when the art of printing, which became known in Europe nearly 900 years later, was invented in China. . . . Thus within a few years of the time when St. Augustine brought the enlightening influences of Christianity to these Isles, the art of printing—a civilizing agency second only to Christianity—was made known in China."

The re-invention of printing (assuming that the Chinese printing had not then been heard of in Europe) was undoubtedly due to Germany, being done by John Gutenberg who was at work printing about 1450, in fact *Ency. Brit.*, XI., 336, gives him the credit of being the original inventor, not mentioning anything about the Chinese! The quotation is, " The active mind of Gutenberg had adopted several plans for making money before he invented the art of printing with movable types, which is his great claim upon the gratitude of mankind."

In his later experiments, Gutenberg appears to have been assisted financially by a countryman of his, Johann Fust (later Faust).

That the Flood as described in Genesis actually occurred

Prof. T. H. Huxley, F.R.S., devoted a whole chapter to this subject in his *Science and Hebrew Tradition* (1893). It is Chapter VII., and is entitled " Hasisadra's Adventure." The whole should be read, but for the moment we quote the following from pp. 264-5 :—" It is upon this and other unimpeachable grounds, that, as I ventured to say some time ago, persons who are duly conversant with even the elements of natural science decline to take the Noachian deluge seriously ; and that, as I also pointed out, candid theologians, who, without special scientific knowledge, have appreciated the weight of scientific arguments, have long since given it up. But, as Goethe has remarked, there is nothing more terrible than energetic ignorance ; and there are, even yet, very energetic people, who are neither candid, nor clear-headed, nor theologians, still less properly instructed in the elements of natural science, who make prodigious efforts to obscure the effect of these plain truths, and to conceal their real surrender of the historical character of

Noah's deluge under cover of the smoke of a great discharge of pseudo scientific-artillery."

In the *Harms. Ency.*, under 'Deluge,' we find, "It is thus impossible to construct from the Biblical narrative anything like a uniform and detailed account of the event. Moreover, the acceptance of the story as literally and historically accurate requires us to postulate a congeries of miracles hardly even to be imagined."

That William the Conqueror had New Forest depopulated, and many Churches in it pulled down, in order that he might have it as a Royal hunting park

William I. was greatly given to the pleasures of the chase, and was responsible for many harsh forest laws, but that he was as ruthless as is implied by the heading of this article, Mr. C. E. Clark entirely denies at p. 47, *More Mistakes We Make* (1901).

One explanation which has been given to account for the existence of the fallacy is that the ending *tun* of some place names has been thought to mean 'town' or 'village,' whereas it was really the name of a single homestead, so that where, say, ten homesteads were removed it has been thought that 10 towns and villages had been razed to the ground.

Dickens' *Child's History of England VIII.*, is largely responsible for spreading the popular idea, but the *Harms. Ency., sub* 'New Forest,' says the charge against the Conqueror is unfounded.

While *Ency. Brit.* does not refute the popular idea, it also does not support it.

That Sir Thomas Wyatt laid siege to the Tower of London in the first year of the reign of Queen Mary

This siege was a product of the imagination of the brain of Harrison Ainsworth (*The Tower of London*, 1840), to whom we are also 'indebted' for another fallacy, viz., that connected with 'Black Bess' (*q.v.*). It is unfortunate that even the authors of some school books should go to historical novels for their facts. In this manner this imaginary siege has been taken to be a fact.

That Wat Tyler was killed by Sir William Walworth, Lord Mayor of London

The following information appears at p. 217 of *Notes and Queries* of August, 1919 :—

"JACK STRAW AND WAT TYLER (12 S. v. 153).—In a sense both were Walworth's 'victims'—Tyler more directly. The truth is somewhat less dramatic than the legend. The interview between the King and Tyler was fairly amicable until one of the royal suite (Sir John Newentone, who had lost Rochester Castle to Tyler) interfered to say that he recognised in Tyler a notorious thief and marauder. For this the rebel would have killed him with his dagger had not Walworth interfered. He struck at Walworth, whose armour turned the blow, and who then drew sword and wounded Tyler, who turned and fled to his followers; whereupon another Kingsman (Ralph Standish, afterwards knighted) pursued and mortally wounded him. Tyler fell from his horse and was carried half dead into St. Bartholomew's, close at hand. Walworth, on his return from rousing the city for the King, missed the body of the rebel chief, and on learning his refuge had him out and beheaded him. The head was carried on a pole 'to intimidate the commons,' and afterwards, with that of the other chief ringleader, Jack Straw, replaced those of Tyler's victims on London Bridge.

"The story of Walworth's dagger in the City arms seems also to be mythical. It was originally a sword of St. Paul, and an old device before the fourteenth century.

"GEORGE MARSHALL."

"There can be no doubt that Jack Straw was hanged, in the company of Robert Starling and other chiefs of the rebellion, as it was not until the night of June 15, 1381, the day of Tyler's death, that Richard gave authority to a commission composed of Sir William Walworth, Sir John Philpot, and Sir Nicholas Bramber, to deal with criminals according to law 'or by other ways and means,' whereupon Straw and the others were arrested. Indeed it is not even strictly accurate to say that Walworth killed Wat Tyler; he wounded Tyler in the shoulder, causing him to fall on his horse's neck, but the acutal *coup de grâce* came from the sword of John Standwich, one of the King's squires, who followed up Walworth's blow by instantly running Tyler twice through the body.

"W. A. HUTCHISON."

Vide "That the dagger in the City of London Arms, etc."

That the 'Marseillaise' is, or ever was, a revolutionary song composed to support the French Revolution

It was composed on April 24, 1792, by Capt. Claude Joseph Rouget de Lisle, an engineer officer of the French Army, at

Strasburg. " He is said to have composed both the words and the music in a fit of patriotic excitement after a public dinner. The piece was at first called *Chant de l'Armée du Rhin*, and only received its name of Marseillaise from its adoption by the Provençal volunteers whom Barbaroux introduced into Paris, and who were prominent in the storming of the Tuileries. The author himself was unfavourably affected by that event. He was a moderate Republican, and was cashiered and thrown into prison ; but the counter-revolution set him at liberty. . . He seems to have been a very well-meaning and harmless person, and he had one moment of remarkable inspiration."—*Ency. Brit.*, XXI., 13.

The *Cyclo. of Names* describes him as " the son of Royalists, refused to take the oath to the Constitution abolishing the Crown, and was stripped of his rank as first lieutenant and imprisoned. He escaped after the death of Robespierre."

According to Grove's *Dic. of Music*, II., 220, it was sung in the house of the Mayor of Strasburg on April 25, 1792, copied and arranged for a military band on the following day, and performed by the band of the Garde Nationale at a review on Sunday, April 29.

We have only to add that Barbaroux, who led the Marseilles battalion in the attack on the Tuileries on August 10, 1792, was also a Royalist, to complete the refutation of the idea that the famous song was in support of the Revolution.

That the ancient Grecian and Roman Statues were always entirely white

That this is a fallacy may be proved by visits to the British Museum, the Louvre, etc., where it will be found that portions of some of the old sculptures are still coloured. We have it too, on the authority of a connoisseur of art that parts at least of some of the old statues were coloured. The *Harms. Ency.* implies the use of colour thus, " J. Gibson strove to revive polychromatic sculpture."

The ancient Egyptians certainly used colours freely in connection with their carvings.

That Apsley House, Piccadilly, London, was given by the Nation to the first Duke of Wellington

" In 1830, after protracted negotiation with the Crown, the Duke bought the freehold of Apsley House for the moderate

sum of £9,532, though even this he thought too high a figure." —*Vide* Appendix to the 8th Report of the Commissioners of Woods and Forests, pp. 32-42.

"It is a fallacy to suppose that it was a gift from the nation."—p. 299, *Piccadilly*, by A. Dasent. (Macmillian, 1920.)

That the 'Yeomen of the Guard' and the 'Warders of the Tower' are the same

The following paragraphs appeared in the *Evening Standard* of June 29, 1922:—

"The King's Bodyguards.

"A common error amongst most people is the one that associates the Yeomen of the Guard, who were yesterday inspected by the Duke of Connaught, with the Warders of the Tower of London. They have no connection. The Yeomen of the Guard is one of the three personal bodyguards of the Sovereign, and of the three they are the best known and the most often seen.

"The others are the Honourable Corps of Gentlemen-at-Arms, composed almost exclusively of ex-officers of the old Regular Army, and whose duties are inside Buckingham Palace, and possibly on special occasions, such as a levee, at St. James's Palace.

"The other bodyguard is the Royal Company of Archers, and is in attendance on the King only when the Court is in residence in Scotland."

The Yeomen of the Guard are familiarly known as 'Beefeaters,' the meaning of which word, according to Prof. Skeat, is its natural English one, though usually a French meaning is ascribed to it.

There is no difficulty in this case of seeing how the confusion of the Yeomen of the Guard with the Warders of the Tower has arisen, for *they wear the same uniform!* The Warders of the Tower are honorary members of the corps of Yeomen of the Guard, but they have distinct duties connected with the Tower of London, and are *not* part of the bodyguard of the King, nor under its officers.

That St. Paul taught the resurrection of the body in the ordinary sense of the word 'body'

"The eschatology is being seriously modified by the conception of a 'spiritual body,' which is prepared for us so soon

as our ' outward man ' decays in death. The resurrection of the flesh is explicitly denied (1 *Cor.* XV., 50) ; but a new and incorruptible ' clothing ' will be given to the soul in the future state."—Dean Inge, D.D., *Outspoken Essays* (1921), pp. 224-5.

" The 'spiritual body' of the risen dead (1 *Cor.* XV.) is not the ' natural ' ' flesh and blood ' body. Paul does not teach the resurrection of the body in the ordinary sense of the word ' body ' ; a fact, often overlooked, but pregnant with many consequences."—Footnote to p. 112 of Huxley's *Lectures and Essays* (1889).

That the Oak Tree at Boscobel in which King Charles II. hid is the one now on the site

" Boscobel Oak.—I saw the existing tree, for the first time, fifty-two years ago. I was then told that it was the original one in which King Charles concealed himself after the Worcester fight. My informant being a master at the school in which I received my inoculation in English history, I naturally accepted the statement as gospel truth. Later on the fallacy of the same became evident.

" Several times since 1870 I have heard people declare that the present tree is the original one, and I have also seen it so mentioned in print. Lately I found the following interesting information, which forms part of an advertisement in *Jackson's Oxford Journal*, November, 1810, with reference to the sale of Boscobel Estate, Staffordshire. The area of the property is given as 659 a. 3 r. 19 p., and possession was to be obtained at Lady Day, 1811 :—

" This truly valuable and important freehold property so well known, and so justly celebrated as the place where King Charles the Second was concealed in an oak tree, and to the present day marked out by the growth of an oak on the very spot, possesses the singular advantages of being a Manor within itself, in a county abounding with game.

" Here it is evidently intended that the reader should understand that a young tree arose, or one was planted, on the exact spot where the original tree was known to have stood. I know that there is information concerning the above tree in ' N. & Q.' (6 S. viii. 166, 317, 351 ; x. 127), but I have no means here to consult the same.

" Herbert Southam.

" Loxley House, Woking."

" [At the first reference a correspondent quoted *The London Post*, August, 1700, to the effect that the original tree had been blown down. At the second this was contradicted from the 'Boscobel Tracts,' and the tree was said to have fallen a sacrifice to the zeal of Charles's loyal subjects. The present tree, it was recalled, is supposed to have sprung from an acorn of the King's tree. At the third reference a descendant of the Penderel family reminds us that Charles climbed into a polled oak—being the more bushy. The present tree has not been polled. Stukeley, visiting Boscobel not long after the Restoration, found the original tree almost cut away by travellers, and a ' young thriving plant from one of its acorns ' growing close by its side.] "—*Notes and Queries*, 28 Oct., 1922, pp. 347-8.

That when the Israelites complained that they could not make bricks without straw, they meant that they needed straw to hold the clay together mechanically

The account of the brickmaking appears in *Exod.* V. Sun-dried bricks are used in South Africa and Egypt among other places. They are much stronger than would be expected, but are very irregular in shape, and thus when built into a wall some parts of them are liable to be subjected to tensile and shearing stresses. If chopped straw were mixed with the clay (the author has never seen this done) it might help to resist these stresses, and thus increase the strength of the bricks, but the tensile and shearing strengths of straw are not great, so the gain is doubtful. Probably the strength of the bricks would not concern the Israelites. The question was the number they had to make as their task, and this would be affected by the plasticity of the clay. The more plastic it is the easier it is to make bricks of it, and the plasticity is considerably increased by the presence of tannic acid. Hence it is suggested that the straw was allowed to rot in water and the resulting liquor was mixed with the clay, thus making it more plastic and permitting the task number of bricks per day to be made more easily. The action would thus be a chemical (colloid) and not a mechanical one.

That the crossing of the legs and/or arms of the effigies of certain Knights indicates that they were Crusaders and the number of crusades in which they took part

Mr. Donald Gunn kindly dealt with this matter as follows :—

"Proof of the error lies in the following facts :—

"1. Many knights represented in this posture are known not to have gone to the Crusades.

"2. Many who certainly went have their effigies with legs uncrossed.

"3. Several effigies exist of women shown in this position.

"4. Most monuments of this kind are later in date than the Crusades, in fact, they extend as late as the early part of the 15th century.

"5. The bulk of the Crusading knights were from Continental countries ; *but no cross-legged effigies exist outside England.*

"It was probably a monumental fashion and nothing more."

The Rev. C. J. Cox, who, I suppose, was one of our soundest ecclesiologists, wrote :—

"Surely it is time that the imaginary connection between cross-legged effigies and the Crusades should be exploded ; and yet how rampant is that fiction in certain places, and how constantly it has to be contradicted !

"Mr. Hartshorne considers that the popular fiction that cross-legged effigies are monuments of Knights Templars has evidently arisen from the fact that six out of nine effigies in the Temple Church are so represented. In controverting this fiction he incidentally exposes another, for he continues, 'With the exception, however, of one effigy, which is not cross-legged, it is extremely doubtful whether any of these celebrated figures are memorials of Templars. They are all habited, not in the distinctive dress of the order, as exhibited in the only known effigy of a Templar in the church of St. Yred de Braine, near Soissons, but in ordinary military costume."—*The Antiquary*, 1894.

He adds, "The truth seems to be that the attitude was a purely conventional one, for some time in vogue with English sculptors."

That Pickwick, Wardle, and Perker met Sam Weller at the George Inn, the Borough, Southwark

The meeting was at the White Hart, which was formerly near to the George. White Hart Yard is all that remains.

That "Handley Cross" is or was a town or village

"HANDLEY CROSS (12 S. i. 228).—It is certainly a fictitious name. For many years the belief was entertained that

Cheltenham was the town which Mr. Robert Smith Surtees had in mind when he wrote *Handley Cross*. A lengthy disquisition on the subject, signed by a writer who subscribed himself ' The Mouse in the Corner,' appeared in *The Illustrated Sporting and Dramatic News* of Nov. 20, 1886, in which it was not only asserted that Surtees was staying in the vicinity of Cheltenham when he conceived the idea of his book, but further that he took for his prototype of Mr. John Jorrocks one Paul Crump, a welter-weight yeoman who hunted a pack of harriers, and resided in the ' fifties ' at Coomb Hill, near Tewkesbury. But quite recently, in a work entitled *Northern Sport and Sportsmen*, by J. Fairfax Blakeborough, it is contended that Croft Spa, near Darlington, in the Hurworth country, is the original of Handley Cross ; and as Mr. Surtees was himself a Durham man, it is more than probable that this hypothesis is well founded. On the other hand, however, Mr. Charles Fox, ex-huntsman of the Blackmoor Vale Hounds, and at one time whipper-in to the Hurworth pack, while admitting that Mr. Surtees was familiar with Croft Spa, and, indeed, owned a fishing lodge near Neasham, a mile distant from that watering-place, recently expressed the opinion, in a sporting contemporary, that Handley Cross could not have been intended for Croft Spa, since the pump room of the latter does not boast of a ' spacious vestibule ' such as that described in *Handley Cross*. Another correspondent—though on what grounds he based his belief I have no knowledge—insisted that Leamington was Handley Cross. Personally, nevertheless, I lean to Croft Spa ; but there is much force in an observation made by Mr. Charles Fox that—

" ' Mr. Surtees used a bit of this place, a bit of another ; a bit of one country and a bit of another, to help him tell his story in his own inimitable way.'

" WILLOUGHBY MAYCOCK."

Notes and Queries, April 1, 1916, p. 275.

That the small (originally shuttered) windows found in many churches, and often set in the south wall of the chancel, were ' lepers ' windows ' through which the diseased person was allowed to receive or witness the Sacrament

" This is certainly untrue. By a Pontifical Canon lepers were expressly forbidden to enter churches *or churchyards*. Moreover, structural details in many cases render any such

use impossible. Most modern authorities agree that at the time of the Mass the Sanctus bell was rung from these ' low-side ' windows."—Donald Gunn.

That the Magi made obeysance to the Child *in the Stable*

It was in the house—inn—according to St. Matthew, but the Child was in the manger according to St. Luke.

" It becomes pretty certain that those pictures which represent the Magi as worshipping the Holy Infant *in a stable* surrounded by cattle are wholly incorrect and misleading."—C. E. Clark, *More Mistakes We Make*, p. 139.

That Nelson disobeyed orders at the Battle of Copenhagen

Mr. C. E. Clark quotes Prof. Knox Laughton as follows, " It is very well established that Parker sent his flag-captain, Otway, with a verbal message that the signal was to be understood as permissive, and was made in that way so that the whole responsibility might rest with Parker, if Nelson judged it advisable to discontinue the action. If he thought it advisable to continue he was at liberty to do so. He judged it right to continue ; and the little pantomime [of putting the telescope to his blind eye] was only a joke, at the expense of Col. Stewart standing by, who had no knowledge of the message Otway had brought." Southey, *Life of Nelson*, p. 215, supports this explanation, but Oman & Gardiner say Nelson disobeyed. E. Muirhead Little, F.R.C.S., speaking at the Casual Club, gave the ' permissive ' account, and *Ency. Brit.*, XVII., p. 323, says, " . . . judiciously left him to act for himself."

That the Orientation of Churches began with the Christian era

" It is well known that the orientation of churches and temples long ante-dated Christianity.

" The practice was by no means general in the early days of Christianity. Rome built its churches regardless of that position. St. Peter's and the earlier church on the same site had their altars placed at the west end.

" Orientation was a tradition from heathen times, and many early Christian Churches were built on the ruins of heathen temples. It has been shown by Sir Norman Lockyer and others, that the orientation of the ancient temples and the stone circles of neolithic times had partly a utilitarian

object in affording means to fix the time of year, usually at the solstice in days when almanacs were non-existent.

"If it be true that Christian churches were orientated to the place where the sun rises on the morning of the patron saint's day, agriculturists could learn in church when to pursue their operations.

"As to the 'when' and the 'where' of orientation, the reply might be 'neolithic times' and 'everywhere.'"—E. L. P.

"The article 'Altar' in the *Catholic Ency.* has (Vol. I., p. 365) a section on 'Orientation,' in the course of which it is stated, as follows:—

"'The custom of praying with faces turned towards the East is probably as old as Christianity. The earliest allusion to it in Christian literature is in the second book of the Apostolic Constitutions (200-250, probably) which prescribes that a church should be oblong with its head to the East. Tertullian also speaks of churches as erected in 'high and open places and facing the light' (Adv. Valent., iii). . . . The existence of the custom among pagans is referred to by Clement of Alexandria, who states that their 'most ancient temples looked towards the West, that people might be taught to turn to the East when facing the images' ('Stromata,' vii., 17, 43).'

"JOHN B. WAINEWRIGHT."

Notes and Queries, Sept. 11, 1920, p. 214.

That Pompeii was overwhelmed by a stream of molten lava

"Pompeii was not, like Herculaneum, buried in a solid mass of volcanic tuff, but merely covered with a bed of lighter substances, cinders, small stones and ashes, thrown out by the volcano, and falling from above on the devoted city."—*Ency. Brit.*, XIX., p. 444.

Prof. Edward Bensly refuted this fallacy at p. 177 of *Notes and Queries*, Feb. 26, 1921.

Vide *Herculaneum, Past, Present and Future*, by Waldstein and Shoobridge (1908), in which Prof. Hughes refutes the stream of lava legend.

That a certain Roman sentry in Pompeii at the time of its overwhelming by an eruption of Vesuvius died at his post while patiently waiting for the change of guard

Had we corrected this fallacy during the late war we should probably have been liable to be shot at dawn under 'D.O.R.A.'

Prof. Bensly dealt with this matter at p. 177 of *Notes and Queries*, Feb. 26, 1921, thus :—

" THE SENTRY AT POMPEII (12 S. viii. 131).—The story has somehow attached itself to the tomb of Marcus Cerrinius Restitutus, just outside the Porta Ercolanese. A. J. C. Hare gives it, with two mistakes in the spelling of Cerrinius, on p. 212 of his *Cities of Southern Italy and Cicily* (1883), where he speaks of :—

' A vaulted niche, in which the fully armed skeleton of a soldier was found. He was evidently on guard at the neighbouring gate, and, faithful to his trust, only took shelter here from the burning shower, whilst his fellow-citizens were escaping.'

" But the greatest authority on Pompeii in his day, the late Prof. August Mau, who was responsible for the account of Pompeii in Baedeker's *Unter-Italien und Sizilien*, declared, p. 148, 13th ed., that the legend, like so many stories about Pompeii, was an invention.

" The ill-informed are still called on at times to believe the town was overwhelmed by a stream of lava !

" EDWARD BENSLY."

Once more art is responsible for the perpetuation of a fallacy. " Faithful unto Death," by the late Sir Ed. Poynter, P.R.A., is now in the Walker Gallery at Liverpool, and represents a Roman soldier, in full armour, awaiting his fate at his post, amid the dead and dying.

Mr. Clark refutes this legend at p. 53, *More Mistakes We Make*.

That the black bandana Kerchiefs worn by Sailors of H.M. Royal Navy are in memory of Nelson's death

An article, entitled, " Nelsoniana," by E. H. Fairbrother, appeared in *Notes and Queries*, Oct, 21, 1922, and at p. 324 we read, ". . red-and-yellow handkerchiefs or bandana kerchiefs were frequent, but black predominated, the fable that black was introduced in memory of Nelson's death being of modern origin and without foundation."

Vide chap. on seamen's dress, by Capt. Robinson, R.N., in *The Royal Navy*, by Norman Wilkinson and H. L. Swinburne.

That St. George, the patron Saint of England, was a real person and of British birth

" It is something of a paradox that April 23 should be dedicated from Saxon times by common consent to the

mythical memory of a shadowy Christian hero, St. George, who won a hazy fame at an unspecified date as the slayer of a dragon. St. George's nationality and career are problems which historians have not solved. The most authentic fact concerning him is his alien origin and race. The historian Gibbon identifies St. George with Cappadocia, that Turkish province of Asia Minor. . . But no speculator, however venturesome, has claimed St. George for an Englishman or has associated with England any tradition of his career."—Sir Sidney Lee, F.B.A., in the *Daily Mail*, April 23, 1920.

That the three estates of the Realm are the King, the Lords, and the Commons

" The proper meaning of this phrase [the Three Estates of the Realm] as applied to the English Constitution, has been the subject of some dispute. Of its original meaning there can be no doubt. It indicated a division of society into classes or orders, and in England these orders were the nobles, the clergy, and the commons."—*Ency. Brit.*, VIII., 557.

In Parliamentary language ' the lords spiritual, the lords temporal, and the commons.'

Vide *Ency. Brit.*, XVIII., 306 ; *Harms. Ency.*, IV., 380.

Brewer, *Phrase and Fable*, p. 483, gives a Fourth Estate—The Daily Press !

That Whitechapel Mount was a plague pit

" Mr. Balleine, the sometime curate at Whitechapel St. Mary's, declared it is a myth that victims of the dreaded disease were buried pell-pell at the Whitechapel Mount. The plague pit for that then semi-rural locality was where St. Philip's Church now stands, behind the modern London Hospital. . . —Mc."—*Notes and Queries*, Aug. 6, 1921, p. 118.

That Yew Trees were planted in Churchyards for the purpose of making bows from them

" The planting of the yew in churchyards was at one time supposed to have been done with a view to the supply of yew staves. But, while importation from abroad was fostered, there seems to have been no statute enforcing the cultivation of the yew in Great Britain ; on the other hand, a statute of Edward I. (cited in *Gard. Chron.*, 6th March, 1880) states that

the trees were often planted in churchyards to defend the church from high winds."—*Ency. Brit.*, XXIV., 744.

"The consensus of opinion seems to be that originally these trees were planted in churchyards as an emblem of the resurrection owing to their perpetual verdure. . ."—Arch. Sparke, p. 98, *Notes and Queries*, Jan. 29, 1921.

That when a Church is so built that the nave and chancel are not in line, the deflection was intentional and had a symbolical meaning, as it represented the drooping of the head of Christ upon the cross

"Antiquaries and architects agree that this is bosh; the faulty orientation of one part or the other being only present when a church has been built piecemeal and at different periods, and is due merely to an unskilful lay-out."—Donald Gunn.

MUSIC.

That it is good to allow the Resin to accumulate on the Belly of a Violin

THIS fallacy has probably arisen from the fact that, other things being equal, an old violin is better than a more youthful one, and that the accumulation of dust and dirt gives a violin the appearance of being old, much in the same way as we see bottles of new port wine in the wine shops with a layer of dirt one-eighth of an inch thick carefully placed on them! The accumulation of the resin adds weight to the belly and prevents it vibrating properly, and in any good book on the violin detailed instructions are given for the removal of this resin by means of turpentine on clean linen; and for the removal of dust from the inside by means of dry barley (with the husks on) put in at the *f* holes and shaken about.

That Catgut is made from the intestines of Cats

"Now, divine air! now is his soul ravished! Is it not strange that sheep's guts should hale souls out of men's bodies?"—Much Ado About Nothing, II., iii., 55.

"Tickling the dryed gutts of a mewing cat."—New Eng. Dict.

The etymology of this word is obscure. Dr. Brewer ascribes it to a contraction of "cattlegut." Another form is "catling-gut." The *Cent. Dic.* says, "Catgut does not seem ever to have been prepared from cats' intestines, and the word is, consequently, supposed to stand for 'kitgut,' by confusion of 'kit,' a little cat, with 'kit,' a fiddle." But whatever the derivation, it is certain the intestines of cats are not used for the manufacture of catgut, the intestines of sheep being the source of the raw material, though those of the horse are occasionally used.

Mr. Donald Gunn, writing on Sept. 25, 1919, suggested another origin of the word catgut, "The caterwauling noise produced upon the violin at the hands of a beginner would surely give the humorist an opening, that he could hardly miss, to suggest the particular animal that supplied the material for *that* set of strings!"

That a Cracked and Patched Violin is better than one of the same age without Cracks and Patches

There are probably more fallacies connected with the violin than any other musical instrument. This may be due partly to its early origin, and partly to its importance, having caused it to be widely—though not wisely—discussed. To read some of the books on the construction of the instrument gives one the idea that if their particular rules, dimensions, and materials were departed from in the slightest degree, the resulting instrument would have about as much sound in it as a " London Stock " brick, and that the quality of the tone would be even worse !

Many years ago the author, when in Cape Town, made five violins—no doubt the writers of the above books would call them *fiddles*, if nothing worse ! The first three made no attempt at being of the orthodox shape, but the last two did, though they were all made before any instructions on the art of violin making had been read ; consequently, even those which were intended to be orthodox departed somewhat widely from the instructions. One of the monstrosities was said to have a fair tone ; another certainly had no tone at all, but this we believe to have been caused chiefly by the inelastic nature of the wood (a very soft, grainless, Cape cedar) ; and the third was made of wood, the greenness of which was only equalled by that of the individual who was foolish enough to spend any time on it. This one naturally had no tone, though it now has a crack in the belly a quarter of an inch wide. So much for cracks !

While two of these experiments were thus such failures, the one that gave the good results (considering the crudeness of the workmanship) was the one that departed most from the orthodox form. [An ordinary violin-case, *i.e.*, a wedge-shaped box with straight sides and a curved top, will give a fair idea of its shape.] The first orthodox one was made much more carefully than the last one mentioned, and had good wood in its favour, in fact it had *too much* good wood, for when completed, it was half a pound heavier than the model from which it was copied ! The tone of this was not so good as that of the first monstrosity. Lastly, the second orthodox one also had good wood and workmanship in its favour, and was only slightly too heavy when finished. This is said to have an excellent tone [it gained a bronze medal at the Colonial

and Indian Exhibition, London, 1886], though judging from the books we afterwards read, it should not sound at all, for among many other things, there was the terrible " lost secret of the old varnish " (*q.v.*) to contend with also !

A good violin should be taken great care of, and the fewer cracks and patches the better ; for, were the popular idea correct, we should make violins of patchwork and the necessary glue and resin in the first instance.

That playing Discords on a Piano puts it out of Tune

Playing a piano consists in causing certain of the wires to vibrate, and the combination or sequence of notes struck is chosen so as to give a pleasing auditory effect. This is playing concords. In playing discords, the only difference is—although it may sound much more !—that the combination, or sequence, of notes struck does *not* produce a pleasing auditory effect, though each individual wire, whether struck in a concord or discord, always gives the same number of vibrations per second. Hence, the mere fact of playing a discord does not tend to put a piano more out of tune than playing a concord, but in the ordinary course of events discords are played by persons who are not skilled pianists or musicians at all ; and hence, they are liable to ill-treat the instrument by thumping, etc., and this would tend to put it out of tune. But while a discord *per se* has no deleterious effect, it does not actually tend to improve a piano as the playing of concords does, for a concord causes the sound-board to vibrate in a manner that it will be called upon to do in the actual performance of some composition, whereas the discord will exercise the sound-board in some other manner, such as it will not be required to do in practice.

As an illustration, suppose two exactly similar and new pianos, and two equally skilful pianists. Let these two performers make use of their respective instruments for the same number of hours per day, and the same number of days per year for, say, two years, one performer playing only concords, the other equally carefully playing only discords ; then at the end of the period the piano that has had discords played on it will not be so mellowed and improved in tone as the one that had concords executed on it. We believe the experiment has been tried of mellowing violins by a mechanical arrangement which drew a bow over the strings ;

but this ' harping on the same old tune '(?) was not found to do the good that a skilful performer could in the same time, and this for similar reasons to those stated above. What occurs when a note of a piano goes out of tune is, the pins to which the ends of the wires are attached ' give ' slightly, the tension of the wire is thereby lessened, and the pitch of the note is consequently lowered. Or the frame in which the pins are inserted may alter its shape slightly, and this will have a similar effect ; hence, one of the advantages of an iron frame, which is not so much affected by the condition of the atmosphere.

Lastly, the temperature of the wires will affect the notes they emit in the following manner :—The wires are not all the same length, but are shorter and shorter as we pass from the lower notes to the higher ones. Now, when steel, of which most of the wires are made, is raised in temperature it expands ; therefore, when the temperature rises *each inch* of the wires becomes longer by the *same* amount, hence, the total elongation of a wire twenty inches long will be four times the total elongation of a wire only five inches long ; consequently, the lower notes are lowered more than the higher ones, and then the piano is out of tune. The actual length of the vibrating portion of the wires is also slightly increased, owing to the expansion of the frame ; this effect itself would still further flatten the notes, but it also prevents the tension in the wires becoming so low as it otherwise would do on account of the expansion of the wires, hence the expansion of the frame has a differential action ; and when the distance between the points of support of a wire is constant, while the wire itself elongates, the *tension* is decreased, and it is this which flattens the note. On the other hand, if the temperature fall very much below the temperature at which the piano was when it was tuned, then the total *contraction* of the longer wires will be greater than that of the shorter ones ; hence, for similar reasons, the lower notes will be more sharpened than the higher ones, and the differential action of the contraction of the frame would be similar to what it was before.

That the Art of Making Varnish for Violins is Lost

We admit we have no direct evidence (not having tried to get any) to bring forward in support of the above statement being a fallacy, but it is our opinion—take it for what

it is worth ! and see the fallacy on cracked and patched violins —that it *is* a fallacy. The world is advancing in knowledge by leaps and bounds, though there is an *infinite* unknown field, and our skill in manufacture is vastly superior to what it was only fifty years ago. Why, it is not so very long ago when it was considered a grand success to be able to turn an engine cylinder that was true to within *a quarter of an inch !* Now one-thousandth of an inch is a common limit of inaccuracy for machine parts, and Prof. C. V. Boys, F.R.S., measures time in *millionths of a second,* and the heat of moonshine in units which he compares to the heat of a single candle at a distance of a quarter of a *mile !*

In other branches of industry similar examples could easily be given ; therefore, it seems unreasonable to think that we should have retrograded in the manufacture of varnish or polish. We do not believe that the varnish is the all-important substance that some writers on the violin would have us believe, but that the new varnish, almost necessarily going on to new violins, is given the discredit of the inferior tones, which are truly due to the newness of the violin. There are violins being made now which, as regards workmanship and materials and even tone, are as good, or even better, than those of the old masters. (*Vide infra.*)

That the tone of an Old Violin is necessarily better than that of a modern one

The best violins that are made now will probably be every bit as good as the old violins are now, when they (the new ones) have been played on and seasoned for the same time, *i.e.*, for some 200 years.

In fact, judging by the two tests (and we have heard of others) which are recorded below, it is not even necessary to wait for the modern violins to be 200 years old in order for their tones to be as good as those of the old makers.

" Paris, Friday.

" A contest took place in Paris last night which seems to vindicate the contention that modern violins are as good in tone as those of ancient make for which thousands of pounds are paid by enthusiasts.

" A number of violins were played in a dark room, and at the end of the competition a vote was taken from the numerous musical and artistic audience present, with the

result that the finest violin was judged to be a Belgian instrument dated 1912; the second was a French 1911 violin, and not until the third came a Stradivarius, valued at more than £3,000."—*Daily Mail*, Sat., June 22, 1912.

"Mr. Albert Sammons, the violinist, screened from the view of the audience—an audience of musical notabilities—at Aeolian Hall, W., yesterday afternoon, played twice the 'Hymn to the Sun' from Rimsky-Korsakov's 'Golden Cock,' and the audience was asked to vote by a show of hands for the fiddle with the better tone.

"One was a Stradivarius, the other the prize-winning violin in Mr. W. W. Cobbett's competition for new English instruments. There was not a very great difference between the numbers of partisans for fiddle No. 1 and fiddle No. 2, but there was no doubt that the latter had a decided majority.

"Then the announcement was made that No. 1 was the 'Strad' and No. 2 a new instrument by Mr. Alfred Vincent, of London! The price of the latter is £40. The Stradivarius may be worth 20 times as much—or more."—*Daily Mail*, Feb. 20, 1923.

That American Organs have Pipes in them similar to those in Church Organs

"The American organ (a kind of harmonium) owes its popularity to its being less pronounced and reedy in timbre (its softer tone being nearer to that we are familiar with in the church organ), and to its being easier to play for simple domestic use.

"The harmonium and American organ are both known as 'free-reed' instruments, the musical tones being produced by tongues of brass, technically 'vibrators,' set in oblong frames [similar to those in a mouth-organ.—ED.]; the sides of which they do not quite touch, but pass, when in movement, freely downward—the 'beating reeds' used in church organs covering the entire orifice. A reed or vibrator set in periodic motion by impact of a current of air, produces a corresponding succession of air puffs, the rapidity of which determines the pitch of the musical note. There is an essential difference between the harmonium and the American organ in the direction of this current; in the former the wind apparatus forces the current upwards, and in the latter sucks it downwards."—A. J. Hipkins, F.S.A., in *Ency. Brit.*

A friend of ours, who possesses an American organ, and believes that it contains organ pipes, will not allow us to pull the said organ to pieces in the search after knowledge and truth ; partly, no doubt, because he values his instrument—pipes or no pipes—and partly because he does not wish to feel 'done,' for, of course, when buying it he was told it contained pipes !

That on a perfect musical instrument A♭ and G♯ are the same note, and similarly that E♭ and D♯ are the same note

This idea has almost certainly arisen from the fact that in the case of the piano—the most common instrument—each of the foregoing pairs of notes is represented by only one key. The piano is, however, not a perfect instrument in the sense that a perfect chromatic scale can be played upon it. The difference between A♭ and G♯, or between E♭ and D♯, is very small. For example, suppose one of the notes C be represented by 320 vibrations per second, then going up the scale D♯ would be represented by 375 vibrations per second, while E♭ would correspond with 384. Similarly, G♯ would be given by 500 vibrations per second and A♭ by 512. In days gone by certain pianos and organs were fitted with separate keys for these and other additional notes. Examples of these are to be seen in the Victoria and Albert Museum, London ; and the Metropolitan Museum of Fine Arts, New York. Handel presented the Foundling Hospital, London, with an organ furnished with additional keys, and the original organ in the Temple Church, built by Father Smith in 1688, possessed fourteen sounds to the octave (instead of the twelve of a modern piano), each of the four notes named above having a separate key.

In tuning a piano the differences pointed out are distributed among several notes, and the errors are then so slight as to be scarcely perceptible. On a violin, or other similar instrument, every note can be rendered perfectly.

Further information will be found in *A Text Book of Physics*, by Dr. W. Watson ; *Elementary Lessons on Sound*, by Dr. W. H. Stone ; and *Hamilton's Art of Tuning the Pianoforte*, edited by Joseph Warren.

That Handel composed "The Harmonious Blacksmith," and that he did so while sheltering from the rain in a smith's shop.

He did not compose the air at all, so there are obvious objections to his having composed it in a blacksmith's shop! He wrote variations upon the air, but the composition of the air itself is ascribed to several musicians, Handel not being included among them.

Richard Clark engraved the piece under "its true title," 'The Harmonious Blacksmith, a favourite air by Wagenseil, with variations by G. F. Handel, newly arranged for the piano, organ, harp, by Richard Clark.'

Vide *Life of Handel*, by Schoelcher (1857).

That "Weber's Last Waltz" was composed by the composer of "Der Freischütz"

"The piece known as 'Weber's Last Waltz' is not Weber's at all, but Reissiger's and forms No. 5 of his 'Danses brilliantes pour le Piano-forte' written in 1822, and published by Peters of Leipsig in 1824. The probable cause of its being ascribed to Weber is that a MS. copy of it, given by Reissiger to Weber on the eve of his departure for London, was found among Weber's papers after his death here."—p. 484, Grove's *Dict. of Music and Musicians*.

It has also been published as a song under the titles, "Weber's Farewell," and "Song of the Dying Child."

That the time-sign C prefixed to a musical composition is simply the initial letter of 'common time'

"One of the most common mistakes made by musicians and others is that in connection with the time sign C prefixed to musical compositions, thus :— This is generally interpreted as meaning 'Common Time,' *i.e.*, four beats to one bar, and in actual experience that is perfectly true, nevertheless this interpretation has been the result of a mistaken judgment in past times.

"In the early days of music, compositions were generally written in 3-time (3 beats in one bar). This time was chosen in compliment to the Trinity, which was regarded as the embodiment of perfection, and the time was represented by a complete circle at the beginning of the piece, thus :—

All other times (*i.e.*, not containing 3 beats in a bar) were regarded as " imperfect " and were represented on the staff by means of a broken circle thus :— Hence in course of time this broken circle became mistaken for the letter " C," especially as in the growth of modern music this time became much more general than the triple time. It only remained for an enterprising printer to decorate the broken circle by adding the dot, which completed the transformation of the broken circle into the letter C and at the same time firmly fixed the whole fallacy in the popular mind."

The foregoing fallacy was kindly given to me and written up by Dr. Thos. R. Mayne, Mus.D.

That the playing of wind instruments induces consumption of the lungs

John Jones, M.B., p. 76, *Medical Vulgar Errors Refuted* (1797), " I think otherwise, provided the use of them commence while the lungs are in a perfectly sound state, as by exercise they must be rather strengthened than weakened ; wind instrument performers being remarked for longevity."

Quain's *Dict. of Medicine* deals pretty fully with ' phthisis,' and ' occupation-diseases,' but does not suggest that playing wind-instruments causes, or predisposes to, consumption. Even in the case of glass-blowers it is pointed out that the risks they incur are those due to exposure to high temperature, viz., bronchial and pulmonary affections, and also cataract. " Occasionally glass-blowers develop a cystic swelling of the cheek, due to air passing up the duct of the parotid gland ; thickened patches of mucous membrane inside the mouth and cheek ; and also deafness." As a matter of fact they are more subject to alcoholism than tuberculosis, and glass bottles are now completely blown and made by automatic machinery.

Harms. Ency. also does not support the popular idea.

That a well-annealed wine glass can be broken by singing into it

" There is an old story that some celebrated singer with a powerful voice was able to break a wine glass by singing into it. If this really happened, it was no doubt a case of resonance. A wine glass has a natural period, as is easily shown by tapping it, when a musical note is given out. If this note is sung, the glass will be set vibrating, and might conceivably

vibrate to such an extent as to break."—J. W. Capstick, M.A., D.Sc., p. 136, *Sound* (1913).

" The story in the *Daily Mail* of the shattered wine glass, which mysteriously cracked a few minutes after some cold coffee had been poured into it, has brought several letters from correspondents describing similar puzzling occurrences.

" Mr. J. A. Simpson, of St. Paul's Avenue, Hyson Green, Nottingham, writes : ' My wife and I were sitting quietly in our living room many years ago when an ordinary, quite sound, empty tumbler standing on the mantelpiece—which was not warm—fell into several pieces.'

" A representative of Messrs. F. and C. Osler, glass merchants, of Oxford Street, said yesterday that there was no mystery about the breakages. They could be caused either by bad annealing (tempering) of the glass or by a sudden change of temperature. The thicker part of the glass would not respond so quickly to the change as the thin part.

" In the case of the wine glass the cold coffee affected the thin part of the glass more than it did the thick part. The glass contracted unevenly, and the result was a crack or ' fly '—as the glass makers call it—in the bottom of the bowl, round the top of the thick stem."—*Daily Mail*, July 18, 1916.

The explanation of the representative of MM. Osler is correct, and it is obvious that if a glass having such internal stresses were used for the singing experiment, it would be more likely to break. Prof. C. V. Boys, F.R.S., tells me that he has broken a glass by singing into it, but he nicked the glass first with a file.

Not only does glass break spontaneously but even hard steel gauges which are used in engineering workshops. Thousands of these were made during the period 1914-18, and in some cases they were found not merely cracked but broken when taken out of store. If the gauges were made of soft iron this would not occur, but soft iron is not suitable for the purpose as the dimensions would soon be altered by wear.

That the echo in a large room or concert hall may be stopped by stretching wires across it overhead

Both light and sound are due to vibrations, but those of light are extremely small compared with those of sound. The wave length of light is about ·00006 centimetre, whereas the

wave length of the middle C of a piano is 1·292 metres, while that used in wireless telegraphy is many times the latter.

Now, there are sound 'shadows' as well as ordinary shadows due to obstruction of light, and to produce a shadow of either kind the size of the object interposed must bear a certain proportion to the size of the respective wave length, and the relative sizes of the wave lengths just given are some indication how big the difference in the objects must be. Hence sound shadows are much less common than ordinary ones. This reasoning shows how extremely unlikely it is that the wires would have the desired effect, and we find Prof. Poynting writing :—

"Wires are frequently stretched across a room overhead, probably with the idea that they will prevent the voice from reaching the roof and being reflected there, but there is no reason to suppose that they are efficient. The only cure appears to consist in breaking up the reflecting surfaces so that the reflection shall be much less regular and distinct."—Prof. J. H. Poynting, D.Sc., F.R.S., *Ency. Brit.*, 11th ed., XXV., p. 154.

That the tune of 'Auld Lang Syne' was composed by a Scotsman

"The air is derived from a strathspey, originally published in Robert Bremner's 'Reels,' 1759. This is the earliest published collection of reels known. There are two versions of the song in existence, both written by Burns. The first version appeared in Johnson's 'Scots Musical Museum,' 1796, No. 413, and the second in Thomson's 'Scottish Airs,' 1799, No. 68. The present popular melody was first attached to the song by Thomson, in consultation with Burns. The air is sometimes attributed to William Shield, but he never claimed the authorship. Henley, among others, has fallen into this error in the 'Centenary Edition' of the poet's works. For a full history of the air 'Cumberland' should consult the 'Songs of Burns,' by the late James C. Dick (Frowde).—Iain MacDougall.

"Air Written by an Englishman.

"In a book entitled 'Stories of Famous Songs,' by S. J. Adair Fitz-Gerald, there is a chapter devoted to this world-famous song. After giving his readers some specimens which existed before Burns's time (one written by Sir Robert Ayton, 1570-1638), he deals with the music and the composer. Mr.

Fitz-Gerald says :—' The melody to which the lyric is now sung was beyond dispute composed by William Shield, who was born at Durham, 1748, and buried in Westminster Abbey in 1829.' The tune is to be found in Shield's opera, ' Rosina,' which ' was first brought out on Dec. 31, 1782.' In the introduction to his book Mr. Fitz-Gerald says ' this work is the practical proof of some fifteen years' agreeable labour in the fields of lyric literature and song lore.' This being so, I think his statements can be accepted as authoritative.—J. F. M."—*The Weekly Scotsman*, Mar 21, 1914.

That the Major Key is always used to express cheerfulness, and the minor, sadness

The author is indebted to Mr. Clifford B. Edgar, B.Mus. (Lond.), for pointing out this fallacy, his refuting examples being *Oh, ruddier than the cherry*, which he considers one of the most typically cheerful tunes, and which is in the minor key, while, on the other hand, one of the most solemn, melancholy, and dirge-like tunes is the *Dead March in " Saul,"* which is in the major key. On writing to Dr. Percy Rideout, D.Mus. (Lond.), he replied, on Dec. 8, 1916, " I started collecting instances to disprove the popular impression, and the result was that I found so many that it caused me to wonder where I should end. The truth is that the most potent factor in musical construction, which determines the ' frame of mind ' of a piece, is rhythm. ' Movement ' overshadows tonality, melody, and harmony in deciding the ' mood ' of music. You may, however, like to know of some instances. Firstly, there are several well-known penitential hymns in a major key ; many *slow* sonata movements (especially in Beethoven) are in the major. Handel's *Largo* in G major and Mendelssohn's *O rest in the Lord*, C major, occur to one as instances. Gaiety in the minor mode can be found in hosts of Elizabethan and cavalier songs. There are the well known last movements of Beethoven's *Moonlight Sonata* (C sharp minor) and of his *Pathetic Sonata* (C minor), both brilliant and energetic pieces. The *Rackocsky March* from Berlioz's *Faust* is a striking instance. Also the *Marche Militaire* in B minor of Schubert. The *Ride of the Walkyries* of Wagner is another.

" It is always due to the casting vote of rhythm whether the result is grave or gay, sad or cheerful, restrained or rollicking, but I do not say that major or minor mode is immaterial ; far from it."

"MUSICAL QUERIES.—Handel flourished when the old ecclesiastical modes were gradually giving place to our major and minor keys. The association of the latter with cheerfulness and sadness respectively has, therefore, also been of gradual growth. Hence we are not surprised to find the air *Come and trip it as you go*, in Handel's *L'Allegro* in the key of C minor, or *He was despised* in E flat major. In the latter there are poignant harmonies, and all the more impressive in that they are specially reserved for the words 'a man of sorrows and acquainted with grief.'

"As to 'another example' of a Dead March in a major key, it is soon found. It is the march Handel wrote for *'Samson,'* for which the *Dead March in 'Saul'* was, however, soon substituted as the more striking of the two.—J. S. S."

Notes and Queries, Sept. 9, 1916, p. 216.

Harrison Hill names *The Miller of the Dee* as a good example of a distinctly jovial song in the minor mode, while *The harp that once thro' Tara's halls*, a sad song, is in the major mode. "*The last rose of summer* (Moore), surely one of the most plaintive songs ever written, is in the major. *The Cruiskeen Laun* (Irish) to the tune of *The Little Jug*, with a perfectly jovial reference to 'grim death,' is in the minor mode, so if anyone ever thought that 'minor' means 'slow' or 'doleful,' it could only be—well, that he had never thought of thinking for himself at all."

On June 19, 1919, Mr. Harrison Hill very kindly sent yet more illustrations to the author, proving this as an undoubted fallacy.

". . . Our music gives no pleasure to savages and their music is to us in most cases hideous and unmeaning. Dr. Seemann, in some interesting remarks on this subject in the *Jour. of the Anthropolog. Soc.*, Oct. 1870, p. clv., 'doubts whether even amongst the nations of Western Europe, intimately connected as they are by close and frequent intercourse, the music of the one is interpreted in the same sense by the others. By travelling eastwards we find there is certainly a different language of music. Songs of joy and dance accompaniments are no longer, as with us, in the major keys, but always in the minor."—Chas. Darwin, p. 867, *Descent of Man*.

That the composition 'The March of the Men of Harlech' commemorates a well known historical March

The *Cyclo. of Names, sub* 'Harlech,' says (quoting from *Grove's Dic. of Music*), "Its castle was captured from the Lancastrians by the Yorkists in 1468, and held out long for Charles I. The national Cambrian war song, 'The March of the Men of Harlech,' is said to have originated during the former of these sieges."

The *Harms. Ency.* says the same.

Mr. Archibald Sparke, replying at p. 113 of *Notes and Queries*, of Aug. 5, 1916, said: "'The March of the Men of Harlech,' or, to use its Welsh title, 'Rhyfelgyrch Gwyr Harlech,' is said to be 'beyond question the finest specimen of martial music in the world.' The composer's name is unknown; it was probably composed during the Wars of the Roses, when Harlech Castle was besieged by Gwilym Herbert, Earl of Pembroke, for Edward IV. (1468-9). Richard Llwyd says:—

"'We are indebted to this siege for the spirited strain "The March of the Men of Harlech." The hardships suffered by the brave garrison was so much the subject of conversation in the country that it gave rise to a malediction still living in the voice of the neighbourhood, "Yn Harlech y bo chwi" (Go to Harlech). In the "Antiquities of Wales," written by Dr. Nicholas, it is stated that "by the order of the King (Edward IV.) William Herbert, Earl of Pembroke, led a powerful army to Harlech, and demanded the surrender of the place; but Sir Herbert, the Earl's brother, received from the stout defender this answer— 'I held a tower in France till all the women in Wales heard of it, and now all the women in France shall hear how I defend this castle.' Famine, however at length succeeded, and the intrepid Welshman made an honourable capitulation."'

"The old words, if they ever existed, have perished; the Welsh verses in present use were written by J. Ceiriog Hughes. The song was introduced into England by Mr. John Thomas, harpist to Queen Victoria, at St. James's Hall, on July 4, 1862."

In *Ency. Brit.*, XII., 954, *sub* Harlech Castle, we read, "Here, in 1460, Margaret, wife of Henry VI., defeated at Northampton, took refuge. Dafydd ap Ieuan ap Einion held it for the Lancastrians, until famine, rather than

Edward IV., made him surrender. From this time is said to date the air ' March of the Men of Harlech.' "

Vide *T.P.'s Weekly*, Mar. 13, and Apr. 24, 1915.

That the Piano is of German Origin

From the *Harms. Ency.* we learn that this instrument was invented about 1709 by Bartolommeo Cristofori, a harpsichord maker in Florence, and that " Claims for the German origin of the piano were frequently made until, in 1881, A. J. Hipkins finally settled the question by proving the priority of Cristofori's invention."

Ency. Brit. agrees.

That a Piano should not be played on the same day as it is tuned

Tuning consists of altering the tension of the wires forming the notes, which is done by a slight turning movement of the wrest-pins round which one end of each wire is wound. These wrest-pins are usually inserted into tightly fitting holes in a strong and solid wooden wrest-board, and it is the friction between the pins and the sides of the holes which prevents the pins from rotating. There *is* a difference between the friction between two bodies in contact when they are in relative motion (sliding one on the other), and when they are not in motion, so that the turner has to exert more force to *start* tightening a wire than he does the moment the motion has started, but once he stops, the statical friction comes into play again and helps to prevent movement of the pin. Probably even the dynamical friction (that is the friction when the pin is moving) would be ample to prevent the tension of the wire from causing the pin to move.

If the pins had not been moved for a long time and the piano was in a damp place, the pins might rust even inside the holes. This would cause greater friction, and after being tuned the statical friction would not be as great as before, but the amount of rusting that could take place in one day (after tuning) would be so little that that effect may be neglected. There seems therefore to be no reason why a piano should not be played upon *immediately* after it has been tuned, but if it were badly out of tune there is good reason why it should not be played upon *before* it was tuned !

That the quality of music depends on the difficulty of its execution

It is said that after someone had played a solo in the hearing of Dr. Johnson and Boswell, the latter asked the former how he liked it, and as Johnson was not exactly enthusiastic about it, Boswell said, " Do you know it was a very difficult piece ? " " Difficult," replied Johnson, " I wish it had been impossible ! " [The author has failed to find this anecdote in Boswell's *Life of Johnson*.]

A proud father after Mary Elizabeth had played her latest fireworks asked a musician, " Professor, what do you think of my daughter's execution ? " " Quite in favour of it," was the reply !

Harrison Hill, writing on Aug. 11, 1919, gave the following illustrations of simple music of high quality :—

" Sterndale Bennett's quartette, ' God is a Spirit,' is a simple and easy anthem, but it is *good music*.

" ' I know that my Redeemer liveth ' is not difficult. It is a simple melody, but he would be a bold man who should say it is not good music.

" ' Kathleen Mavourneen,' ' Annie Laurie,' and ' Home, Sweet Home ' are three of the sweetest songs ever written, but they are not ' difficult.' " And then Harrison Hill gave the following true anecdotes, which he has expressed so beautifully that his exact words are quoted. They were *not* intended for publication, but it would be a loss for them not to be published :—

" During the recent Peace Celebration a piano was brought into the dining room of this residential club.

" One night, we were all having supper, conversation was going on all over the room, and, hardly knowing whether my fellow members would like the interruption or not, I went to the piano and very quietly played Handel's ' Largo.' There was a hush, and they listened attentively to the end and then from all over the room came expressions of thanks, and while I was playing, somehow quite a different ' atmosphere ' came upon the members. It was the spell of immortal music. Yet Handel's ' Largo ' is *very* easy, *much* easier than any ragtime melody. Much easier than any florid ' Air with Variations,' but it has just one quality, it is immortal, it belongs to a sphere higher than ours. Great musicians and simple folk alike grow silent and calm when it is played.

When next you hear it, look round at the faces of the listeners and you will understand.

"My friend, Felix Moscheles, the artist, was Mendelssohn's godson. I used to play to him some of the 'Songs without Words,' or the 'Cradle Song' that Mendelssohn wrote as his birthday gift when the little Felix was born. I played it for him not many days before his death. The old man listened, and in his low, gentle voice, said, 'Yes! Mendelssohn wrote that for me eighty-six years ago.' I think it was probably the last time he heard it in this world. Perhaps they sung it for him as he entered the world of peace, but all these things were quite simple and quite easy, and there is something also perhaps in a remark Moscheles used to make to me, if I may be forgiven this: 'I like just to hear your *touch* on the piano. It doesn't matter much what you play.' The greatest pianists of two or three generations were glad to play for him. He knew them all, and yet there was something, which had no relation to *difficulty*, that went from the soul of the player to the soul of the artist. 'Ah! yes!' he would say. 'Other people play to me, so many notes to the mile, but—you,— well, I like just to hear your touch."

That the musical intervals on a well-tuned piano are perfect

"Tradition has it that Pythagoras (585 B.C.) made his discovery of the ratios of the perfect intervals by listening to some smiths who struck the iron on their anvil with hammers of different weights, and thus produced different notes from the metal. But the narrator of the tale has disregarded the obvious fact that, save for slight variation due to the greater or less heat of its different parts, a metallic bar, like a string, always sounds a note of the same pitch whatever be the weight of the instrument with which it is struck."—*Ency. Brit.* XVII., 78.

This is far too complex a matter to be dealt with in a short article. We can give only a few indications of the problems involved, and refer readers to text books for a full account.

If we represent the length of a string necessary to sound the note middle C by 1, then the lengths of the segments of that string necessary to produce the notes of the ascending major scale of C will be:—

Note	C	D	E	F	G	A	B	C
Length of string	1	$\frac{8}{9}$	$\frac{4}{5}$	$\frac{3}{4}$	$\frac{2}{3}$	$\frac{3}{5}$	$\frac{8}{15}$	$\frac{1}{2}$

These are the simple ratios of Pythagoras. If we tune a piano by perfect fifths, all the major thirds will be so sharp as to be unbearable ; and if by depressing the fifths we tune the major thirds perfect, then the fifths will be so flat as to be unsuitable for various combinations. A compromise is thus made : each fifth is equally flattened, *i.e.*, the interval is *not* perfect, and a practical result is arrived at which introduces far less error than the average piano possesses through being out of tune in the ordinary sense of that phrase.

If we wished for a perfectly tuned piano, then for " the natural key of C, seven sharp keys and seven flat keys, it appears that we require 35 notes to the octave." [E. H. Barton, D.Sc., F.R.S., *Text Book on Sound*, p. 488.] This is impracticable, so we have to make do with 12 digitals to the octave, and probably very few have their ears offended by the compromise—in fact most are probably unaware there is a compromise !

Vide Watson's *Physics*, and Hamilton's *Art of Tuning the Pianoforte.*

That the quality of a note sounded on a piano can be altered by the ' touch ' of the player

The quality of a note depends on the accompanying overtones or harmonics, for a pure note, consisting of vibrations of only one periodicity, is rare. Consequently the same note sounded on different instruments has different qualities, but the same note on the same instrument must have the same *quality* each time it is produced, unless some change is made in the instrument, *e.g.*, the quality of the note is altered by putting a mute on a violin or by muffling a cornet. What can be varied on any one instrument is the *loudness* of the note, loudness being greater the greater the amplitude of the vibration of the part producing the note. In the case of a piano any one note depends on the length, diameter and tension of the wires forming that note, and its quality cannot be altered once the piano is made. Each note of a piano is produced by its own hammer striking one wire or group of two or three wires at a fixed place. The loud and soft pedals do not alter the quality of a note, but merely its intensity or its duration. The mass, shape and material of the hammer of any one note is unchangeable, and the force of the blow of the hammer on its wires depends solely on the mass of the hammer and the speed at the moment of striking the wire. The mass is unalterable,

and therefore the *only* thing that can be varied is the speed of the hammer, and this is the only control a pianist has over each and all the notes, though this fact is very unpopular with them! It appears to them to render their great art too simple, but while the explanation is simple, its execution is not, and when the various effects of accenting (increasing the hammer speed) any one or more notes in a chord or sequence of notes are allowed for, it accounts for the great variety of effects which are possible, but this does not alter what we have said about each individual note.

That the vocal chords produce the human voice in the same manner as a violin string gives a note

"The serious student of phonation will find sound information as to the parts played by the sinuses and the glottal lips in the production of vocal tone in Musehold's *Akustik und Mechanik des menschlichen Stimmorgans*, 1913, which gives excellent laryngo-stroboscopic photographs of the mis-called 'vocal cords' in action, confirming and supplementing Manuel Garcia's famous communication to the Royal Society in 1855 on the differing laryngeal mechanism for chest and falsetto registers. The kinematograph might do good service here.

"The exhibition of a slow-motion film, such as that prepared by Prof. Panconcelli-Calzia and Dr. Hegener, of Hamburg, showing the lips of the glottis producing a definite note of chest register by periodically parting and meeting, parting and meeting, letting out as many tiny puffs of compressed air per second as there are double vibrations in the note sung (quite in agreement with what R. Willis, of Cambridge, wrote in 1838), and finally opening very wide for the singer to draw breath, would give in one minute a clearer idea of their double-reed action than pages of careful description may convey. Few misnomers, surely have wrought so much pseudo-scientific havoc as Ferrein's *chordæ vocales*.—W.P."

Nature, No. 110, 1922, p. 872.

Hence we learn that the human voice is produced on the same principle as the sound of a siren, which is a mechanical device for emitting puffs of air at any desired rate.

The vocal chords are so short, and their mass such, that if they produced our voice in the manner of a violin string, we should speak in tones approximating to those of mice!

ENGINEERING AND SCIENCE

That a Hollow Column is capable of supporting more than a Solid one of the same External Diameter

THERE is a saying that " There is no smoke without a fire," and doubtless this error has arisen from the fact that *under certain conditions* a hollow column is stronger than a solid one of *the same net cross-sectional area*, but it is absurd to think that if you take a cast-iron column, one foot external diameter, and bore a hole four inches diameter down the centre, from end to end, you thereby strengthen the column. In the case of a long column to support a vertical load, if you are limited to a certain cross-sectional area or weight of material, you will obtain a column which will have more *lateral stability* (*i.e.*, resistance to bending sideways) by making the column in the form of a hollow cylinder ; but here again special knowledge is required to know how large to make the hole in the centre for a given cross-section and height. Similarly, if a wrought-iron girder (beam) be required to support a vertical load at the centre, while it is itself supported at the ends, the most economical result will be obtained by adopting a hollow section or its equivalent.

That if a Match were struck inside a Gasometer full of Gas the Gas would Explode

A gas explosion may be defined as the rapid combustion of a quantity of gas mixed with a certain amount of air, the mixture being confined, or partially confined, as in a room, or the cylinder of a gas-engine. Now, combustion usually means the combination of an inflammable substance with oxygen, one of the two most important gases of which the air is formed. Hence, if no oxygen (or air) be present, it is impossible for combustion, and, therefore, an explosion, to take place. Even the match itself would not light but for the fact that either it, or the substance on the box on which it is struck, has potassium chlorate and manganese dioxide in its composition, and these substances contain sufficient oxygen to start the match in life ; but if, after this, it cannot obtain oxygen for itself, it comes to an untimely end.

On Sept. 2 and 3, 1916, the author was conducting a 24-hour trial of some boilers at Langwith Colliery. At 0.45 a.m. he was informed that a Zeppelin air raid was in progress. At 1.30 a.m. he saw a glow in the sky in the direction of Retford as if a house were on fire, but the extreme steadiness of the glow pointed to some other cause, and later information showed that an incendiary bomb from one of the raiding airships had penetrated the top of a gas-holder at Retford and set the gas on fire as a jet from the hole made. It burned steadily for half an hour before it began to die down. There was no explosion. The distance of Retford from Langwith is 13 miles.

"UNDERGROUND GASOMETERS?

"Councillor C. Watson has given notice to move at the meeting of Deptford Borough Council to-morrow that all gasometers within one mile of any human habitation should be placed underground."—*Pall Mall Gazette*, Feb. 5, 1917, p. 7. This paragraph shows the waste that may occur owing to the existence of popular fallacies.

"GASOMETER BLOWN UP.

"30 PEOPLE INJURED.

"The east end of Sheffield was startled last evening by an explosion which smashed practically every window within a radius of half a mile and resulted in some 30 casualties.

"Shortly after six o'clock the meter-house, a substantial building attached to the Grimesthorpe Gas Works, caught fire and blew up with a loud report. The adjoining gasometer was pierced and blew up, the flames shooting high into the air.

"Assisted by the works brigade, the City Fire Brigade, under Superintendent Hadwick, succeeded in confining the fire to the immediate area of the gas works.

"Only a few men were at work in the neighbourhood of the explosion. Nine were seriously injured and about 20 others less seriously hurt.

"The following statement was made by Mr. Hanbury Thomas, the managing director of the Sheffield Gas Works:—

"'We have two large station meters and one of them was undergoing repairs by the contractors. Their men had been working on it some days. The valves were turned off and the meter had been taken to pieces, but gas must have got into it. Several men were working with naked lights inside, and the explosion blew the meter-house to pieces. How the men

escaped death is a miracle. The adjoining meter was punctured by the explosion and burst into flames, but as the holder gradually deflated it automatically extinguished the fire.' "—*Daily Mail*, Aug., 28, 1917.

The foregoing account in a non-technical paper is a good illustration of how at least some erroneous ideas get about. When the journalist's unaided efforts are read we see it is stated that " The adjoining *gasometer* was pierced and blew up, the flames shooting high into the air." But when the statement was made by the managing director it was probably taken down *verbatim*, or was given out in type, and then we learn it was the adjoining gas *meter* which was punctured and which " *burst into flames*," not ' blew up ' (exploded) as stated earlier. Note also it only needs an *o* between ' gas ' and ' meter ' to make ' gasometer ' (which should, by derivation, mean a gas meter, but which in fact is a gas holder. The reason the gas meter exploded is because the men being in it, it contained air which, mixed with the gas that leaked in, made an explosive mixture.

The last two lines of the newspaper report are ambiguous, for they give the impression that *gas* extinguished the fire ! They merely mean that when all the gas had escaped from the holder and burnt there was no more to burn, and so the flame naturally went out !

That if a rope of one square inch cross-section be tied to a hook in a wall, and a man pull the end of it with a force of 100 lb., then the stress in the rope is 100 lb. per square inch ; but that if two men, one at each end of the rope, pull against each other, each with a force of 100 lb., then the stress is 200 lb. per square inch

In the first instance the stress *is* 100 pounds per square inch, but it must be noticed that, in accordance with Newton's Third Law of Motion (" Action and reaction are equal and opposite "), the wall pulls the rope with a force of 100 pounds, just as much as the second man does in the second case, though—unlike the man—it is incapable of " taking up the slack " if the man move towards it. Hence, we see that in the second case, the second man merely takes the place of the wall, and no portion of the rope is subjected to a greater tension than 100 pounds per square inch as in the first case.

This fallacy arises in more than one practical instance, *e.g.*, when a part of a machine, such as the cross-rail of a planing

machine, is counterbalanced by means of a cast-iron weight hanging on one end of a chain, which passes over a pulley, the other end being fastened to the cross rail, the question arises how strong to make the chain, and this has caused much discussion, for some people insist (wrongly) that the tension in the chain is equal to the sum of the weights of the cross-rail and the counter-weight. This error was dealt with at pp. 1145 and 1146 of the *American Machinist*, Jan. 14, 1911.

The principle embodied in this fallacy was made use of on at least one historical occasion, for in 1654 Otto von Guericke invented the Magdeburg hemispheres, and showed that when they were exhausted they could not be separated by 16 horses, eight pulling one way and eight the other. He was aware that the same tractive effort could have been produced by eight horses if one of the hemispheres had been attached to a fixed point ; but, with the instinct of a showman he considered that the spectacle would thus have been rendered less striking. It was prepared for the entertainment of the King of Prussia.

That in the case of a Tidal Dock (or Lock) the Pressure on the Dock Gates (or Lock Gates) is Greater when there is a number of Ships in the Dock (or Lock)

The mean fluid pressure on any surface is proportional to the depth of the centre of gravity of that surface below the level of the fluid, and the mean pressure in pounds per square foot on the surface is equal to the product of this depth in feet into the weight in pounds per cubic foot of the fluid. Now, suppose that at high tide, when the dock gates are open, the depth of water in the dock is 30 feet, and that the dock has no ships in it. Let the gates be closed, and when the tide has fallen so that there is no water on the outside of the gates, calculate the mean pressure in pounds per square foot of the water on the gates, multiply this by the area in square feet of the entrance to the dock, and the result is the total force in pounds, tending to burst the gates open. At the next equally high tide (*i.e.*, when there are 30 feet of water in the dock), instead of closing the gates with only water in it, float in a ship or two. As each ship passes in, a volume of water flows out, and this quantity is equal in *volume* to the volume of hull of the ship *below the actual water line*, and is equal in *weight* to the weight of the whole ship. If this were not the case, the water would rise in the dock to a higher level than the sea outside ; but this is impossible with the gates *open*. [It

would do so if the gates were first closed, and the ships were then lifted bodily over the quay into the dock.] Hence we see that whether the ships be in the dock or not, the height of the water is the same, and hence the pressure on the gates is the same. If there be any difficulty in seeing " where the weight of the ships has gone to," then try to realise that the total weight of the water in the dock in the first case is equal to the weight of the water in the dock *plus* the weight of the ships in the dock in the second case. In the case of a lock, account has to be taken of the fact that there is water on both sides of the gates, that on one side opposing that on the other, so that the force tending to burst the gates open is the difference between these two forces.

That Gas-Engines are for Making Gas

As a coffee-mill is for grinding coffee, a cotton-machine for making cotton thread, and a brick-machine for making bricks, it is not unnatural that some should think a gas-engine is for making gas. When the author was " in the shops " of a gas-engine firm some years ago, a lay friend came to see over the works, and after admiring the engines, he inquired : " But what do you do with all the gas when it is made ? " We had to explain that not only did we not make gas, but that our quarterly gas bill was high, owing to the quantity we consumed for driving the engines while testing them before they were sent out. The facts of the case are that an explosive mixture of coal-gas and air is introduced into the cylinder of the engine, this charge is exploded at the right moment, and the pressure of the gases thus engendered (owing to their expansion due to the heat of combustion) acts on the piston in a similar manner to that in which the steam pressure in the cylinder of a steam-engine acts.

That the Technical Terms " Stress " and " Strain " are Synonyms

If you take a straight piece of spring steel of small cross-section and bend it slightly, the deformation from its original condition is called a strain. If it were a piece of soft steel, and you bent it so that on being released it did not recover its original form, you would be said to have strained it permanently. So we see that a strain is a change of form of some body, and something we can *see*. Now,

when you bend the steel you set up certain forces between the particles (molecules) of it, and it is these forces (reckoned on unit area, which is usually one square inch) which are called the stresses, and these we *cannot* see, we merely see their effects (the strains). For example, suppose a steel bar one square inch in cross-section and 10 feet long, fixed vertically by one end to the roof, and the other end fashioned into a hook. Consider a transverse section just above the hook, this has practically no load on it, consequently, we may say the stress is zero. Measure the total length of the bar carefully (this should be done with a cathetometer measuring to the one-thousandth of an inch at least), then hang on a load of 2,000 pounds. Measure again, the bar will be found to have stretched very slightly; the amount of this stretch is called the *strain* [visible]. The load on the cross-section considered is now 2,000 pounds, and as the cross-section is one square inch, therefore the *stress* [invisible] is said to be 2,000 pounds per square inch. If the cross-sectional area were $1\frac{1}{2}$ square inches and the load were 3,000 pounds, then the *stress* would still be the same, but the tensile force on the bar (sometimes erroneously called the total stress) would be 3,000 pounds. The author regrets that these terms are very carelessly used by many of those who should know better, viz., his brother engineers; and if this paragraph induces any of these erring members of the family of men of metal to see that there is a great and *convenient* difference between these two terms, then he will not have laboured in vain.

The confusion may have arisen from the fact that within the elastic limit of a material the strain is proportional to the stress; that is to say, a load of 4,000 pounds would elongate our bar twice as much as a load of 2,000 pounds. This is known as Hooke's Law.

That the Technical Terms "Force," "Power," and "Energy" are Synonyms

Here again, some of the author's professional brethren—or shall we say the quacks of the profession?—are to blame, though not to so great an extent as in the use of the terms "stress" and "strain." The simplest illustration we can give of a force is this:—Suppose a hook fastened to a beam in the ceiling, and that we hang a ten-pound weight on that hook, then we say a force of ten pounds is acting vertically

downwards, tending to pull the hook away from the beam. Hence we see that a force may act on a body *without producing any motion* of that body, though one definition of a force is " that which changes or tends to change the motion of a body." Any moving body must have (or have had) one or more forces acting upon it ; but we may have a body with several forces acting upon it *without there being any movement* of the body.

Work is done when a force acts on a body and *causes that body to move in the direction of the applied force.* Hence, work is done when we lift a weight of twenty pounds vertically upwards for a distance of three feet, for our hand applies a force of twenty pounds to the handle of the weight, and causes the body (lump of iron) to move vertically through the distance of three feet, and $20 \times 3 = 60$ foot-pounds of *work* are said to have been done ; in fact, work is the product of the force causing the motion into the distance moved by the body. It is important to remember that *there is no work done unless there is motion.* We have had to define " work " carefully, in order to define *power*, which is the " rate of doing work," *i.e.*, work divided by time. Hence, if we lift a sixty-pound weight three feet high, and take exactly two minutes to do it in, we are said to have exerted a *power* of $\frac{60 \times 3}{2} = 90$ foot-pounds per minute.

[A horse-power is empirically defined as 33,000 foot-pounds per minute, while a kilowatt is very nearly $= 1\frac{1}{3}$ h.p.]

Lastly, the *energy* of a body is its *capacity for doing work*, and it is measured in the case of a body in motion by the product of half the *mass** of the body into the *square* of its speed, while in the case of a body at rest, its capacity for doing work is measured by the product of the weight of the body into the vertical distance it could fall. It can be shown that either of these results are quantities of *work*, and can be reduced to the same dimensions as " work," *i.e.*, to foot-pounds. In the case of a moving body, its energy is called *kinetic* energy, while in the case of a body at rest, it is called *potential* energy.

Hence we see that :—

Force is measured in pounds.

Power is measured in foot-pounds per minute.

* *Vide* the fallacy *re* mass and weight.

$$\text{Energy is measured in } \frac{\text{lb.} \times (\text{ft. per sec.})^2}{2}$$

Or energy is measured in foot-pounds.

And now we see how *very* far these three terms are from being synonyms.

The old phrase, "What is gained in power is lost in speed," should be, "The loss in speed is proportional to the gain in mechanical advantage," or "What is gained in force is lost in speed."

That the Gearing of Bicycles depends solely on the numbers of Teeth on the two-chain-wheels

The gearing depends solely on the *diameters* of the chain-wheels,* and the average speeds of the two wheels are inversely proportional to their diameters. We have to say "*average* speeds," because with chain gearing the velocity ratio of the two wheels is not quite constant, owing to the effect of the length of the links. This is a very small quantity, and for a full explanation of it the reader is referred to p. 422 of *Bicycles and Tricycles*, by A. Sharp, B.Sc., Wh.Sc. We regret that it is there stated that "the average speeds of two shafts connected by chain gearing are inversely proportional to the *numbers of teeth* on the chain-wheels," for clearly, the teeth are only to prevent the chain slipping on the wheels, and it is worse than useless to chip off one or two teeth from the hub chain-wheel in order to increase (or from the crank chain-wheel to decrease) the gearing of a bicycle. The writer is informed that this has been actually done!

As the distance measured on the pitch-line between any two teeth (*i.e.*, the "pitch") on the crank chain-wheel is usually the same as that on the hub chain-wheel, the numbers of teeth on the wheels are proportional to their diameters, but there is nothing to prevent a manufacturer making the pitch of the teeth on the crank chain-wheel some integral multiple (say, of two or three) of the pitch of the teeth on the hub chain-wheel, and this would certainly not alter the velocity ratio; even the effect of the length of the links would be unaltered.

* The diameter of a toothed-wheel is the diameter of its pitch-circle.

That in Rotary Lawn Sprinklers and Sparges the Rotation is due to the jets of water 'blowing against the air.'

The principle of these sprinklers is the same as that of Barker's Mill, the Scotch turbine, a rocket, or—to go still further back—Hero's Engine, which was the beginning of the steam turbine. If the popular statement were true, then the sprinkler could not rotate in a vacuum, for it would then have no air to blow against, but we shall show that it would rotate still faster in a vacuum. For simplicity, suppose one of the sprinklers with straight, horizontal radial arms or pipes closed at their outer ends, and having a number of small holes, throughout their length, on *one* side only of each pipe, and on corresponding sides of the various pipes. Further suppose that instead of the pipes being circular in cross-section, they are square, with the side containing the holes in a vertical plane. Now, think of one of these pipes, before the little holes were bored in it, with a water pressure of thirty pounds per square inch above atmospheric pressure in it. It will have no tendency to rotate, for the water is pressing equally on its two vertical sides, and thus in opposite directions. Now bore a number of small holes in one side of it, and suppose that the total area of these holes amounts to one-tenth of a square inch, then the water has one-tenth square inch less surface to press against on this side of the pipe; therefore, the total pressure on this side of the pipe is less than that on the other. Hence the pipe tends to rotate towards the side with no holes in it, and if there are several such pipes arranged so that they are free to rotate, then they *do* rotate. The resistance to this rotation is due to the friction of the air, and to the friction of mechanism, which occurs where the rotating portion rubs on the fixed standard. By putting the apparatus in a vacuum we do away with the air resistance, and hence the sprinkler moves faster. Again, in a vacuum the difference between the pressures inside and outside the pipe would be (in the case we have assumed) nearly forty-five pounds per square inch, and the force urging the sprinkler to rotate would be greater than before. The propelling force is greater than that implied herein, because when the sprinkler is rotating there is additional water pressure due to the centrifugal force. For complete treatment *vide* the article by Prof. Unwin, F.R.S., in *Ency. Brit.* XII., pp. 514 and 524; and *Hydraulics*, by Dr. F. C. Lea, p. 302.

That if the form of wheel-teeth be correctly designed the relative motion of the teeth is one of pure rolling

This is rather technical, and we are in fear and trembling lest Mrs. Grundy should hear us 'talking shop'! However, as even an engineer may deign to read these notes, we have plucked up courage and decided to throw this fallacy concerning wheel-teeth in his teeth.

The geometrical demonstration that this *is* a fallacy is long and requires a figure, but those who are interested in the matter will find it clearly explained at p. 447 of *Bicycles and Tricycles*, by A. Sharp, B.Sc., Wh.Sc. The probable origin of the fallacy is also given by Mr. Sharp, viz., that it is from the use of the term 'rolling circle,' in connection with the construction of cycloidal wheel-teeth.

That Sea-water never Freezes

The large oceans outside the Arctic and Antarctic circles do not freeze because the whole of their surfaces are not subjected to a sufficiently low temperature at the same time. One portion might freeze were it cut off from the rest, but not being cut off, and in spite of water being a bad conductor of heat, the warm ocean currents mingle with it and prevent it freezing. Also, the specific heat of water being high, it takes a long time to change its temperature, but at the Poles, sea-water does freeze. Owing to the salts contained in sea-water, it does not freeze till the temperature has fallen to about 28° F., *i.e.*, 4° lower than the freezing point of fresh water. Now if we take a glass jar full of fresh water and gradually cool it, the volume will continue to decrease slightly until a temperature of 39·2° F. is reached; but if the temperature be still further lowered, the volume will increase again, and continue to do so till it solidifies, when the volume of the ice will be greater than that of the original water. The effect of this is that, as the water at the top surface in our jar gets cold it sinks to the bottom, until the temperature of all the water is 39·2° F., then the layer at the top will get still colder, expand, and therefore be less dense than the rest, and hence it will remain on top and finally freeze. But if we fill a jar with sea-water and cool it, this will continue to contract in volume even after 39·2° F. is reached, and it will start freezing at the *bottom* first when the temperature has fallen to 28° F. In freezing, the salts are

left in solution,* and if the ice crystals be collected and melted, the resulting water will be fresh, except for a certain amount of salt which adheres to the ice and gets mechanically imprisoned in it. As the ice crystals form at the bottom of the jar-full of sea-water they will rise to the surface, because the density of ice is less than that of fresh water, and still less than that of sea-water.

That Common Salt is much more Soluble in Hot Water than in Cold

Most salts are more soluble in hot water than in cold, and this is especially the case with potassium nitrate (saltpetre). Twelve parts of this salt dissolve in 100 parts of ice-cold water (0° C.), but at 60° C. 110 parts of the salt dissolve in 100 of water. On the other hand, at 0° C. 36 parts of common salt are dissolved by 100 parts of water, and when the water is boiling (100° C.) only two parts more, that is, 38, are dissolved. This is nicely represented graphically at p. 131 of *Inorganic Chemistry*, by G. S. Newth, F.I.C., F.C.S.

In the case of calcium hydrate (slaked lime) the solubility at 212° F. is only half what it is at, say, 50° F., and at the latter temperature the solubility is only one part in 900 parts.

That, when swimming or floating, deep water buoys one up more than shallow water

This idea probably arises from the mental effects produced in the two cases. When swimming in shallow water (say, four feet deep), we know that on the least fatigue, or for any trivial cause, we can cease swimming and stand on the bottom; but when we are in deep water (anything over ten feet) we know we *must* keep up, and that we cannot give in for some trivial matter, and hence we exert ourselves more, swim better, and feel better.

From the physical point of view the volume of water which our body displaces in either case is the same, and as it is also of the same density, therefore the buoyancy is the same, the

* If we continue to lower the temperature, the brine will increase in strength owing to the freezing out of the fresh water. This will go on until the brine has reached the strength of a definite compound of salt and water. Then a change occurs, and the ice formed will no longer be fresh, but of the same composition as the brine.

total force tending to keep us up being equal to the weight of the water displaced, and this is equal to the weight of our body.

A cubic foot of fresh water at ordinary temperatures weighs 62·4 pounds; therefore, a man weighing 150 pounds displaces $\frac{150}{62 \cdot 4} = 2 \cdot 4$ c. ft. of water. A cubic foot of sea-water weighs 64·0 pounds; therefore, a man weighing 150 pounds displaces $\frac{150}{64} = 2 \cdot 34$ c. ft. of it, that is, less than he does in fresh water; hence a larger portion of his body is above water in the case of sea-water than in the case of fresh water.

That the Blue Sky does not exist when it is a very dull day

The blueness of the sky is supposed to be due to the minute particles of dust that are suspended in the atmosphere, and it is not space itself which is blue. Clouds prevent us seeing through a sufficiently thick stratum of air to give rise to the blue effect, and besides this they intercept the light. If we go up in a balloon, or up a high mountain, so as to leave the clouds below us, then we see the blue sky overhead again.

Suppose we continue upwards by some means or other, let us say by means of Jules Verne's gigantic hollow bullet, then, looking upwards, the blue colour of the sky would become fainter and fainter as the layer of atmosphere got thinner and thinner. We should also find that the ordinary diffused daylight diminished until, when we reached the limit of the atmosphere (say eighty miles) there would be no diffused light and (except for a small supply of direct starlight) in order for us to see any light it would be necessary for us to direct our eyes to the sun. The direct sunlight would fall on one side of our body, so that on holding out a hand it would be strongly illuminated on the side facing the sun, but if we turned our back towards the sun we should see no light. If, when our back was so turned, there were objects in front of us which our body did not screen from the sun's rays, then these objects would be brilliantly illuminated, but all around them would be total darkness.

Prof. John Tyndall, F.R.S., did a good deal of work to show that the colour of the atmosphere is due to dust.

If the air *per se* had any colour, then we should expect to find liquid air of a still deeper blue than the sky. But liquid

air has but a very faint colour, and that is a greenish straw colour.

That turning the hands backwards of a non-striking Watch or Clock damages it

The wheels immediately in connection with the hands of a simple watch or clock are connected to the rest of the train of wheels only by friction, and this being so, it does not do the least harm to turn the hands backwards or forwards. It must be clear that when the hands are turned forwards (or backwards) the whole train of wheels is not affected, for the escapement could not work at that great speed. When we set the hands of a keyless watch, while we are putting the hands on, it merely increases the amplitude of the swing of the balance-wheel a little, and while we are putting the hands back, we decrease this swing. There are also many striking clocks that it would not harm to turn backwards, though this process would probably make the hour struck differ from that indicated by the hands.

That a Dam supports the weight of all the Water it impounds and that consequently if the quantity of water be double, the strength of the Dam must be necessarily doubled also

Two elementary but fundamental hydrostatic principles are here involved :—

(1) Fluid pressure acts equally in all directions.

(2) Fluid pressure varies directly as the depth of the fluid.

Suppose for simplicity that the water or up-stream face of the dam is vertical, and that the ends of the dam finish vertically also, against rock or masonry, the condition of the dam would be then similar to the gate of a tidal dock at low tide. Due to the conditions supposed there would be a considerable pressure of water on the dam. Now imagine that a very large plate of iron is lowered (while held in a vertical position) into the water, being kept a foot away from the up-stream face of the dam. Furthermore, suppose the plate is so large and is just of the right shape to enable watertight joints to be made between it and the bottom and sides of reservoir. Let these joints be made watertight. Then the water is at the same level on each side of the iron plate, which is, consequently, not supporting any water pressure, or

rather the total water pressure on each side of it is equal. This iron plate has obviously not reduced the pressure on the dam, and thus it will be seen that the wall of water, equal in depth and width to the dam and only one foot thick, produces the same pressure on the dam as the whole reservoir full of water does. Within very wide limits, it does not matter how close the iron plate be placed to the dam. If it be only one inch away, and the water level is the same each side of it, then the pressure on the dam will be unaltered, though, of course, the *volume* of water would be, in this case, only one-twelfth of what it was before. We may, in fact, imagine two dams built close together, with water between them, and water on the up-stream face of the upper dam at the same level. Then there will be no resultant pressure on the upper dam, while the down-stream dam will support the full pressure. But if the reservoir above the upper dam be emptied while the water between the dams remains at the same level, then the pressure on the lower dam will remain the same as before, and the pressure on the upper dam will be equal to that on the lower one, only in the opposite direction. The same principle is involved in the imaginary problem of floating a man-of-war by means of a gallon of water. This could be done if a dock were built to fit very closely to the outside of the hull of the ship, and if the water were then poured in between the hull and the dock walls.

If a dam break, then the resulting damage to life and property will bear some ratio to the *quantity* of water impounded.

That a piece of Iron, or other heavy body, will float at a great depth in water

"*Methought I saw a thousand fearful wrecks ;*
Ten thousand men that fishes gnawed upon ;
Wedges of gold, great anchors, heaps of pearl,
Inestimable stones, unvalued jewels,
All scattered in the bottom of the sea.
Some lay in dead men's skulls ; and in those holes
Where eyes did once inhabit, there were crept,
As 'twere in scorn of eyes, reflecting gems,
Which wooed the slimy bottom of the deep."

Richard III., I., iv., 23-31.

There are two probable causes for this idea. One is a sort of converse of the fact that if a cork, which usually floats on water, be carried down to a great depth in water, then it will not float again, but will sink to the bottom, because at

the great depth it gets compressed, all the air is driven out of it, and its density becomes greater than that of water. The other is, it is thought that because the pressure is so great the density of the water is so much increased that it is even greater than that of iron. Water is, for all practical purposes, incompressible; consequently, its density is not increased by the increase of pressure due to the depth; therefore iron, the density of which is nearly eight times as great as that of water, will not float in it even at great depths. While it is true that at great depths the pressure on the underside of a body is very great, it must not be forgotten that the water also presses greatly on the top of the body, and the one balances or nearly balances the other, so that the tendency to rise or fall remains the same as when the depth is less. For iron to float in water, the density of the water would need to be at least as great as that of iron, and for this to be due to compression of the water would mean that nearly 8 cubic feet of water would have to be compressed into one cubic foot! This is impossible.

That Fog Stops Sound

We agree that when there is a thick 'pea-soup' fog in London there is less noise to be heard. This is another matter, though doubtless that is how the fallacy has arisen. When such a fog exists in any town, all forms of traffic have to reduce their speed to a walking pace, while all persons who can keep indoors, or even out of the town, on those occasions do so. There is thus a great reduction in the production of noise. Fortunately, we need not satisfy ourselves with this explanation alone, for the late Prof. Tyndall, F.R.S., made an exhaustive set of experiments on this subject, and a full account of these is given in his book on *Sound* (fourth ed., p. 284). Those who have not time to read the whole chapter, we would refer to pp. 290, 302, 332, and 339. At the end of the latter we have the statement: "A homogeneous air is the usual associate of fog, and hence the acoustic clearness of foggy weather."

That if the Linear Dimensions of a Stone Column (such as Cleopatra's Needle) are doubled it is necessary to double the Linear Dimensions of the Base for Equal Stability as regards Wind Pressure

This fallacy was originally pointed out by Prof. Arch.

Barr, D.Sc., M.I.C.E., in his address to the students delivered at the Inst. Civil Engineers, London, on Jan 13, 1899.

A simple calculation proves the fallacy, but to make the explanation clear a diagram is necessary. Suppose, for the sake of argument, we have a stone column ten feet high and two feet square all the way up. Its volume will thus be forty cubic feet, and if the stone weigh 150 pounds per cubic foot, the total weight of the column will be 6,000 pounds. Suppose the wind to blow on to one of the flat sides with an intensity of twenty pounds per square foot then the total wind pressure will be $10 \times 2 \times 20 = 400$, pounds, and the resultant will act five feet from the base. The tendency for the column to be blown over will, therefore, be $400 \times 5 = 2{,}000$ pound-feet. While the tendency to stability (or moment of stability) is given by the product of the weight of the column into the length of half the base. Thus the moment of stability is $6{,}000 \times 1 = 6{,}000$ pound-feet. The excess of the stability over the upsetting moment is $6{,}000 - 2{,}000 = 4{,}000$ pound-feet, or the moment of stability is three times the upsetting moment. Now suppose the linear dimensions to be doubled, then the column will be twenty feet high and four feet square. Let the stone at the base be partly cut away, so that the column still stands on a base only two feet square as in the first case. The weight will now be $20 \times 16 \times 150 = 48{,}000$ pounds, and the total wind pressure $20 \times 4 \times 20 = 1{,}600$ pounds. The moment of stability will be $48{,}000 \times 1 = 48{,}000$ pound-feet, while the upsetting moment will be $1{,}600 \times 10$ (the resultant wind pressure acting half-way up as before) $=$ 16,000 pound-feet. The excess of stability is thus 32,000 pound-feet (eight times as great as before), or it is equal to three times the upsetting moment as before. We hope this is clear. Looked at in general terms, it comes to this: If the linear dimensions are doubled, the weight is multiplied by the cube of two, *i.e.*, it is eight times as great while the area of one side is only multiplied by the square of two, *i.e.*, by four. But the leverage at which the wind pressure acts is doubled. Hence the upsetting effort is eight times as great, but the product of the weight (eight times as great) into half the base (the same as before) is also eight times as great, and therefore the ratio of one to the other is the same as before, while the absolute stability is positively greater than in the case of the smaller column.

That Increasing the Weight of the Bob of a Pendulum makes the Clock go more slowly

It is a somewhat unexpected fact that the time of oscillation of a simple pendulum depends only on its length, as will be seen from the following expression, which does not include the weight of the bob. By experiment it has been found that

$$t = \pi \sqrt{\frac{l}{g}}$$

Where t is the time in seconds of one swing—

$\pi = 3{\cdot}1416$,

l = the length of the pendulum in feet ; and

g = the acceleration due to gravity, = 32 feet per second per second.

If the bulk of the bob were very greatly increased, then possibly there might be a very slight reduction in the speed, owing to the increased resistance due to the air, but for practical purposes, increasing the weight of the bob of a pendulum does not decrease its speed of oscillation.

That Meteoric Iron does not Rust

In 1820, Faraday made some experiments with steel. He alloyed iron with silver, platinum and nickel (separately), hoping to find a non-rusting alloy ; and apparently this idea originated with the popular belief that meteoric iron, which is rich in nickel, does not rust. Faraday's experiments proved the contrary, namely, that nickel steel rusts more readily than ordinary steel. Stainless steel contains 13 per cent. of chronium.

That Water always Freezes when its Temperature is Reduced to 32° F.

The temperature of water can be reduced several degrees below freezing point (32° F.) without it congealing, especially if the water be pure and it is not agitated ; but if, when it is at a temperature below 32° F., it is shaken, or if a few particles of matter (or, better still, a few ice-crystals) are thrown into it, then the whole solidifies quickly. The action is somewhat similar to that which occurs when a supersaturated solution of a salt is prepared and a crystal of the same salt is put into it, for then the whole crystallises sud-

denly. This makes a pretty experiment to show by means of a magic lantern.

That a Source of Light which emits very few Red Rays may be made Red by enclosing it in a red glass globe

This fallacy has been heard of a good deal in connection with the Cooper-Hewitt and other forms of mercury vapour lamps. Several people have asked why, if the light is wanting in red rays, the containing tubes are not made of red glass. White light (sunlight) is composed of certain proportions of light of *all* colours, while total darkness is the absence of all colour. Coloured glass acts simply as a filter or screen of a peculiar kind, letting through all colour of one kind (which we call the colour of the glass) and stopping all the rest. Consequently, if there is no colour of a particular hue to let through, the glass cannot let it through, and as it does not let any other colour through, therefore it cuts off all light and causes darkness. Briefly, coloured glass cannot create light of a particular colour.

That Water can be found by a Dowser by the use of a Divining-rod

In the first and second editions of this book it was stated that the evidence on this subject was very conflicting. Since the publication of the second edition Prof. J. Wertheimer, B.A., B.Sc., F.C.S., of the University of Bristol, and a special committee of the Royal Sanitary Institute have made a number of experiments with dowsers which leave no doubt that their claims are without foundation.

As a kind of *hors d'œuvre* we may mention that Dr. Chas. Mackay, at p. 251, Vol. I., of his *Extraordinary Popular Delusions*, gives a list of *fifty-two species of divination!* Fine, high-sounding names they have, too, well calculated to impress the uninitiated. The subject is also dealt with by John Brand in his *Observations on Popular Antiquities*. Sir Thomas Browne dealt with the matter in his *Vulgar or Common Errors*, published in 1646, wisely stating, "we are of opinion with Agricola, that in itself it is a fruitless exploration, strongly scenting of pagan derivation," and John Timbs, F.S.A., has a page or so devoted to it in his *Popular Errors Explained*. Books devoted to the subject are *The Divining Rod*, obtainable from Messrs. Denny & Sons, 147, Strand, and Chevreul's *De la Baguette*

Divinatoire (1854). Miss A. Goodrich Freer had an article in the *Nineteenth Century* for August, 1897, and in it she says : "The only educated professional waterfinder in England avows that the rod is merely a dramatic accessory. He shares his instinct with most savages, most wild animals, and even many horses." Prof. C. V. Boys, F.R.S., does not believe in dowsers, as he makes clear in a paper to the British Association (Bristol meeting), nor does Sir Ray Lankester, K.C.B., F.R.S. (See his *Diversions of a Naturalist.*)

"Diviners at a Discount.

"The Government auditor disallowed the whole cost of the Braslodir experimental waterworks undertaken by the Porthcawl District Council on the advice of professional water diviners. The total cost will probably amount to nearly £1,000, the sum in the present account being about £300. A loan of £250, sanctioned by the Local Government Board for the experiment, was allowed, but the whole of the remainder will be surcharged. The auditor observed that the expenditure on water diviners' advice was a waste of public money."—*Evening News*, July 30, 1897.

The Engineer, Sept. 24, 1897, had a short paragraph on divination and a good deal of information will be found in the presidential address delivered on November 6, 1900, by the late Mr. James Mansergh, to the Inst. of Civil Eng. Mr. Mansergh was so eminent a waterworks engineer that it is fortunate he referred to this subject, though he does not appear to have devoted much time to it. It is clear he was not a believer in dowsers, and a large portion of the five pages he gives to the matter are quotations from Prof. Sir W. F. Barrett's voluminous paper presented to the Society for Psychical Research. Sir William Barrett, F.R.S., was professor of experimental physics at the Royal College of Science, Ireland. His original paper of 1897 takes up 282 pages of the Proceedings, and the supplement which he added in 1900 occupied a further 140 pages. Sir William says that nearly 6,000 letters had to be written for the purpose of his first report, which deals with 200 cases of alleged water-finding by dowsers in recent years. A number of cases where the dowser was successful were found, upon geological observation on the spot, to be capable of explanation by the rapid detection of surface indications of underground water by the dowser, and the author particularly draws atten-

tion to this explanation, which he considers important. He believes that, in a similar manner, when people pretend to tell character by reading a person's *hand*, they really base their remarks (possibly unconsciously in some cases) on the general appearance, especially of the face, of their subject, and that if they were compelled to read hands thrust through a hole in a curtain, without ever seeing any more of the person, then they would be hopelessly out in their prognostications, even as they often are in ordinary circumstances. A strong point in favour of this view that the dowser is expert in detecting surface indications of underground water is the fact that Mr. Mansergh never learned of a single *blind* dowser in any country of the world during the four centuries the dowsing-rod has been employed. The divining-rod was formerly also adopted when searching for metalliferous deposits, lost articles, and even criminals. This caused Mr. Mansergh to say that were he to experiment with the forked hazel-twig and find that in a certain spot it pointed downwards, he would not know whether in the eroded cavern below he might expect to find a running stream or a bolting criminal !

Prof. Wertheimer's experiments are reported in full with diagrams in the *Journal of the Royal Society of Arts*, No. 3,040, Vol. LIX. (Feb. 24, 1911), pp. 384-391, and the third paragraph of the introduction is as follows :—

" Many of the professional ' dowsers ' declined any test except the very expensive and quite inconclusive one of ' finding ' water by means of the rod, etc., and then sinking wells to ascertain the accuracy of these indications. In such a ' test ' one cannot, of course, eliminate the possibility that in many parts of the country it is rather more likely than not that water will be found in any place chosen by a man having a knowledge of the conditions under which water is usually found. Moreover, if a well be sunk and no water is found at a certain depth, the water finder can always state that this is due to the well not being deep enough."

In one experiment with Mr. Chennels and the Rev. W. F. Newman, M.A., separately, each of these dowsers was allowed three tries at locating a deep well in the kitchen of Brislington Hall. Not one of the six points selected was over the well. The nearest was 3 ft. away, the next nearest was 10 ft. away, the furthest was 15 ft. off, while the corner of the kitchen furthest from the well was only 19 ft. away

Perhaps the most conclusive experiments were those carried out with Mr. Rowland Pavey in West Town Lane, Brislington, near Bristol. Mr. Pavey was asked whether his rod would indicate the presence of flowing water in an iron pipe and he said "Yes." Mr. Pavey having failed badly in the first set of tests, another set was arranged from which the alleged cause of his failure was eliminated, and Mr. Pavey in sportsmanlike manner undertook to subscribe £5 to the Bristol Hospital *if he failed once out of ten times* in stating correctly when the water was flowing through the main or when it was not doing so. It was also a condition that if he succeeded, Prof. Wertheimer should pay the hospital £10. Such are the risks a man of science may be called upon to take in the cause of truth! The experiments were completed under the precise conditions *required by Mr. Pavey*, and the result of them is shown below :—

Times when the water was turned on and off at the hydrant.	Times according to Mr. Pavey's time chart when, in his opinion, the water had been turned on and off respectively.
off 2.42	—
on 2.46	—
off 2.55	on 2.56
	off 3.00
on 3.01	off 3.03
off 3.08	on 3.09
	off 3.14
on 3.15	off 3.15
off 3.20	on 3.20
	off 3.27
on 3.30	on 3.34
off 3.33	—
on 3.37	off 3.40

Mr. Pavey paid £5 to the Bristol Hospital!

It must be admitted that a more complete failure would hardly have been possible, for instead of failing only once out of ten times, Mr. Pavey *was not right once out of ten times!*

Another set of experiments was made with the Rev. W. F. Newman, M.A., with a view to his saying when there were gold coins under certain cushions placed on the floor of the dining-room at Brislington Hall. Eight cushions were used and two sovereigns were placed under each of two of

these cushions. The indications given by the divining rod were *all* wrong.

At p. 259 of *The Local Government Review* for April, 1911, there is an interesting article by " V.D." on " Waterfinders," which ends with the following quotation from Dr. W. Rossiter Raymond :—

" In itself the divining rod is nothing. Its claims to virtues derived from the Deity, from Satan, from affinities and sympathies, from corpuscular effluvia, from electric currents, from passive perturbatory qualities of organo-electric force, are hopelessly collapsed and discarded. A whole library of learned rubbish which remains to us furnishes jargon for charlatans, marvellous tales for fools, and amusement for antiquaries."

" Sir Ray Lankester has no doubt that, with a moderate knowledge of geology and well known indications above ground of subterranean water supplies, many ' diviners ' can ' find ' water with their eyes open. So, after the ' diviner ' had walked about the castle grounds and located eleven places beneath which the movements of his ' rod ' indicated water, the man of science took him into the castle, blind-folded him, and took him out again by another door. Thus temporarily blinded, he was taken backwards over the same route, and, as before, the ' rod ' was agitated eleven times, but not one of the places corresponded to any of the first eleven ; and though he was taken over the places where he first discovered water, the ' rod ' remained always quite still. Then he was led to a spot beneath which a large quantity of water was passing in a conduit, but he was entirely un-influenced by it even when standing right above it."—*Daily News*, Sept. 22, 1911.

Another set of careful experiments with dowsers was made under the auspices of the *Sanitary Record* in 1913, and most issues of that paper from February onward contain information on the subject, including a series of special articles by Eric K. Rideal, B.A., D.Sc. The issue of April 4, 1913, is a particularly interesting one and in it we are informed that the earliest detailed account of dowsing is given in Agricola's Latin folio on mining, *De re Metallica* (Basle, 1540). The experiments were made at Guildford on April 3, 1913, and details (including the names of the Committee, and of the seven dowsers, and a plan of the three sites) are given in the issue of the 11th April. It is important to note that

at the luncheon, Dr. Beyer, MM. Tompkins, Child, and Antcliffe made short speeches on behalf of the other diviners and themselves and said that such a demonstration was what they had been wanting for years. Mr. Tompkins said he was very pleased with the tests, though they had been a little severe. He asserted he could tell water to the inch in depth, and to the gallon in quantity! Mr. Antcliffe also expressed his great pleasure at all the arrangements. The final report of the Committee appeared in the *Sanitary Record* of May 2, 1913, and from the editorial we abstract the following :—

" We are able to state here now that several of the members [of the Committee] were predisposed towards the claims put forward by diviners, and anticipated that the latter would in some degree confirm them. In this, however, they acknowledge they have been disappointed. The diviners have failed to carry conviction. Moreover, as will be seen from the Report, the practically entire absence of agreement in the findings of the diviners who went over the same ground separately; their inability to discover the presence of a large body of water on Site No. 2, which constituted an underground service reservoir; their failure to discover sewers, and a well-known spring yielding 50,000 gallons per hour, have led the Committee to report adversely against their claims to be able to find hidden or underground waters."

Sir Ray Lankester, F.R.S., devoted an article in the *Daily Telegraph* of June 28, 1913, to the divining rod and referred to the experiments which were made in France in March, 1913, and stated that both they and those made at Guildford " are unfavourable to the pretensions of the diviners, as I will relate next week."

An amusing anecdote of Linnæus was told in *The Gentleman's Magazine* of 1752, Vol. XXII., p. 77 :—

" Linnæus when he was on his voyage to Scania, hearing his secretary highly extol the virtues of his divining wand, was willing to convince him of its insufficiency, and for that purpose concealed a purse of one hundred ducats under a ranunculus which grew by itself in a meadow, and bid the secretary find it if he could. The wand discovered nothing, and Linnæus's mark was soon trampelled down by the company who were present; so that when Linnæus went to finish the experiment by fetching the gold himself, he was utterly at a loss where to seek it. The man with the wand

assisted him, and pronounced that it could not lie the way they were going, but quite the contrary; so pursued the direction of his wand, and actually dug out the gold. Linnæus adds that such another experiment would be sufficient to make a proselyte of him."

The following are further references:—

The Divining Rod, by A. J. Ellis, being Water-supply Paper 416, of the United States Geol. Survey, about 1920. A paper by Dr. Griffith Taylor in the Proc. of the Roy. Soc. of Victoria, XXXIII., N.S., 1921, pp. 79-86. Some of the results of borings, on which Dr. Taylor reported, are given at p. 822 of *Nature*, Aug. 25, 1921. *Nature*, Sept. 16, 1920, and Feb. 23, 1922, p. 247; *The Morning Post*, Oct. 15, 1919; *Evening Standard*, Oct. 7, 1921.

That Beech Trees are never struck by Lightning

"BEECH TREES AND LIGHTNING.

"The popular belief that beech trees are never struck by lightning would seem to be now exploded. Six men were sheltering under a beech tree in the Midlands during last week's severe storm; two were killed, and the others struck down insensible. At the inquest the coroner said he had specially examined the tree, as for years he had read and understood that there was no record of a beech tree being struck by lightning. In this case the lightning had not injured the tree to the extent of damaging a leaf, but it was an accepted fact that six men were sheltering under a beech, and that two of them were killed whilst they stood there. He did not know whether there was anything in it or not, but it appeared to him to be a remarkable circumstance after what he had understood for so long, and he should record the fact that it was a beech tree in the verdict."—*Electrical Review*. Aug. 10, 1906.

Sir Thomas Browne, M.D. (*Vulgar Errors*, Bk. II., Chap. 6), dealt with a variant of this fallacy, which he stated thus, "That bays will protect from the mischief of lightning and thunder is a quality ascribed thereto, common with the fig tree, eagle, and skin of a seal." Notice that he appears to have thought *thunder* dangerous!

The following information, which was published by the Dutch Meteorological Institution, gives the number of times different kinds of trees were struck by lightning between the years 1885 and 1902:—

	Times.		Times.
Poplar	232	Walnut	8
Oak	130	Beech	5
Willow	70	Chestnut	5
Yew	50	Apple tree	5
Fir	27	Cherry...	4
Pear tree	25	Alder	4
Lime	14	Birch	2

The important factor of height is not mentioned.

A writer in the *Daily Mail* of June 16, 1914, stated that the following figures had been given by M. Flammarion, the French astronomer, as the proportion of trees struck in France in recent years :—

	Times.		Times.
Oaks	54	Willows	7
Poplars	24	Pines	6
Elms	14	Beech	6
Walnuts	11	Ash	6
Firs	10	Limes	2

Heights again not given.

Sir Ray Lankester, K.C.B., F.R.S., had an article, "Struck by Lightning," in the *Daily Telegraph* of June 19, 1911, in which he stated that—

"Many more people are struck (according to statistics) in the open than when taking shelter under trees, and it appears (from statistics) that more people are killed when seeking safety under oak trees than under beech-trees, but this may be due to the relative abundance of those trees or to the nature of the soil in which they grow. Avoid a solitary high tree, but seek protection in a wood or clump of many small trees. In a house avoid (during a storm) placing yourself between two large and prominent conductors of electricity, such as the water pipe or gas main and the fireplace."

An elder tree is also popularly supposed to be safe from the effects of lightning. One reason given for this is because the Cross is supposed to have been made from the wood of an elder tree. Also Judas is supposed to have hanged himself on such a tree.

"Judas, he japed
With Jewen silver,
And sithen *on an eller*
Hanged himself."

Piers Plowman's Vision, 593-6.

That putting cold iron bars on barrels of beer prevents the beer being turned sour by thunder

The chief argument against this is that thunder, which is merely a noise, cannot *per se* turn anything sour. There may be certain atmospheric conditions, such as the presence of certain substances, which usually accompany lightning and thunder, and which do turn milk and beer sour, but this is due to these accompanying conditions and not to the noise. The iron bars have a magnetic effect, but they would not alter the constituents of the atmosphere about the beer, and therefore could not affect the latter either for good or evil.

John Brand and John Timbs say the custom of placing cold iron bars on the barrels is common in Kent and Herefordshire.

In former times iron was considered a powerful amulet all the world over, especially as a protection against witches, pixies and spirits.

Vide " That thunder turns milk sour."

That the Pressure of the Water at the nozzle of a fire hose is greater than it is in the hose itself, farther back, where the diameter is greater

This, like the fallacy about the pressure of water on a dam, is rather difficult to explain without going into technicalities, for it is really a principle in hydraulics known as Bernoulli's Theorem, and is another form of the principle of the conservation of energy. In the case of a horizontal pipe, which may vary in diameter throughout its length, the energy of the water depends on two factors ; one being the pressure and the other the speed with which the water is moving. As the total energy is constant, it follows that where the pressure is great the speed is small, and where the speed is great the pressure is small. In fact, at the outlet of the nozzle all the energy is kinetic, *i.e.*, due to the speed of the water, and the pressure is merely atmospheric. If it were greater than this, then on leaving the nozzle, the water would spread out sideways immediately it left the nozzle.

Bernoulli's Theorem is experimentally illustrated by having a large pipe of varying diameter from which small glass tubes are carried up vertically from a number of points along its length. On passing water through the large pipe the water rises to different heights in the glass tubes, those

connected to the larger sections of the pipe showing a greater height or pressure than those connected to the smaller sections.

That a Sparrow on a Telegraph Wire ought to get Killed when a Message is Sent through the Line

If this were true in the case of telegraph wires, then it would be even more so in the case of the overhead trolley wires in connection with electric trams, for the electric pressure in the latter is several hundred times as great as in the former, while the current is thousands of times as great. For all this, birds may be seen sitting comfortably on trolley wires. Neither human beings nor animals feel the effects of electricity unless there is an electric circuit of which our, or their, bodies form a part, so that the current can "flow" in the manner it is trying to. We may sit on an hydraulic main without the least inconvenience, because the water in it is passing by us. If, however, there is a hole in the pipe and the water comes our way it is a very different tale. A somewhat analogous case is that of pinching. We cannot experience a pinch unless a portion of one of our arms, say, is subjected to *two* equal and opposite forces. As long as there is only force we do not feel a pinch.

Mr. A. P. Trotter, B.A., M.I.C.E., the late chief electrical engineer to the Board of trade, has done much to show that the danger due to a third or "live" rail, or to the trolley wire of an electric tram, has been much exaggerated. For example, if your boots are dry you may safely stand with one foot on the live rail and the other on one of the bearing or track rails. Similarly when on top of an electric tram on a dry day you may safely touch the trolley wire provided your other hand is not touching any metallic part of the tram. Although this is so we advise the uninitiated *not* to take these risks. The object of mentioning the facts is to allay inordinate fear, especially in the case of an accident.

That ice is never colder than 32° F. or o° C., the freezing temperature of water

This fallacy may cause you to make a bad bargain, for you might refuse to buy certain ice and accept other at a slightly lower price without going into the question which was really the colder ice. Any body or substance may be reduced to the temperature of liquid hydrogen

(— 260° C.), which is a familiar sight nowadays at the Royal Institution, and the lower its temperature the greater its capacity for heat. Hence, *ceteris paribus*, ice, which is at, say, 10° F., is certainly more valuable than when it is only at 30° F. To be exact, if we call the heat-absorbing capacity of one pound of ice at 10° F. 91 thermal units, then the corresponding capacity of one pound of ice at 30° F. is only 81 thermal units. Consequently it often pays to buy natural ice in preference to artificial, as the latter is sometimes only just ice, *i.e.*, it is only a couple of degrees below freezing.

That when a Steamship Founders her Boilers Explode

It would be difficult to find a more 'popular' fallacy than this one, in spite of the comparative simplicity of the explanation of the error and the fact that it has on several occasions been shown up in the public Press.

The late Sir Frederick Bramwell, F.R.S., M.I.C.E., wrote to the *Times* several years ago and refuted the popular idea. On January 1, 1903, the *Daily Mail*, in a short article, referred to the myth and Sir Frederick's letter to the *Times*, but for all this on November 20, 1905, the following statements appeared in the *Daily Mail*: "The explosion of the S 126's boilers, when the water poured in through the rent made by the ram, was the immediate cause of the heavy loss of life. . . . It is believed that in her case also, with the inrush of the water, the boiler exploded. . . . The general view is that the inrush of water must have exploded the boilers and completed the work of destruction." These three references refer to two separate vessels, one the German destroyer S 126, and the other the Channel steamer *Hilda*. Most of the other morning papers, in dealing with the same two calamities, made similar statements as to the bursting of the boilers."

"In the notices of the foundering of the steamship *Courier* in several of the daily papers it is stated that 'the boiler exploded as she foundered,' and at least two accounts are so circumstantial as to say that this added to the terrors of the accident! The truth of scientific facts does not rest on the authority of those stating them, otherwise I should not trouble to write to you on this matter, seeing that the late Sir Frederick Bramwell, F.R.S., M.I.C.E., wrote to the *Times* many years ago in an endeavour to end the fallacy. It still flourishes, however. Will those responsible

for the statement give a brief explanation as to why a boiler should explode on being immersed in water? As a matter of fact, the immersion of a boiler in cold water cools the water in it, and condenses the steam, so that a vacuum is produced in the boiler, which is consequently more likely to 'inplode' than explode. This fact is easily verified by experiment. Put a little water into a workman's tin flask, boil the water, remove the flask from the fire, and cork it tightly at the same time. Then put it into cold water, and the flask will collapse. The reason for this fallacy is that when a ship founders the sea-water gets to the boiler fires, which are usually numerous and fairly large, and in extinguishing them large volumes of steam are almost instantly produced, because one volume of water forms some 1,600 equal volumes of steam at atmospheric pressure. This escaping steam is mistaken by the non-technical witness to come from the inside of the boiler. Fortunately, steam formed as explained is not likely to harm anyone, unless he be in the stokehold or near by. I believe there is not a single case on record in which, on recovering a foundered steamer, her boilers were found to have exploded."—A. S. E. Ackermann in the *Daily Graphic*, May 2, 1906.

On May 7, the following letter by "Interested" was published by the *Daily Graphic*:—

"I have read with much interest a letter from Mr. Ackermann, A.M.I.C.E., on the subject of the supposed bursting of boilers of steamers on foundering. I have always been very anxious to know why the boilers of a steamer should explode on her foundering, as, of course, the natural tendency would seem to be for the boilers to collapse, owing to the condensation of the steam inside and partial vacuum caused thereby. As you may have noticed, in practically all cases of steamers foundering (unless the engineers have had time to let the steam out of the boilers) some mention is made of the boilers blowing up. I do not think that in so many cases can a mistake have been made, and the escape of steam caused by the cold water rushing into the fires mistaken for a boiler explosion. A well-known naval engineer once gave me a possible explanation of these boiler explosions, which may be of interest to your readers. His theory was that the cold water coming into contact with the boiler-plating caused the outside of it to contract. The inside, being kept warm by the steam, did

not contract, with the result that the plate cracked, with the natural result that the boiler burst. Of course, this is pure theory, but still I think that this explanation seems more or less sound."—" Interested," in the *Daily Graphic*, May 7, 1906.

To the foregoing the author replied thus on May 10 :—

" The explanation quoted by ' Interested ' in the *Daily Graphic* of the 7th inst. is, I admit, a reasonable one, and would probably be accepted as correct if it were backed up by facts, but, as stated before, I do not know of any case in which, on recovering a foundered steamer, her boilers have been found exploded. Undoubtedly some additional stresses would occur in submerging a boiler shell, but these do not appear to approach the elastic limit of mild steel, even when excessively severe conditions are assumed. There is another argument against the explanation given by ' Interested's ' friend. The temperature of the outside of the boiler plates in a furnace is about 700° F., and the temperature of the inside of the same plates, due to a steam pressure of 200 lb. per square inch, is 388° F., and this is about the same difference as between the temperature of the steam (388° F.) and sea-water (say 40° F.). Why, therefore, should the same difference of temperature in one case be a working condition and in another cause an explosion ? Can ' Interested ' refer to specific cases where ' the engineers had time to let the steam out of the boilers ' ? I am interested to know how this was done."

While on May 15 the following letter appeared :—

" Dear Sir,—I quite agree with Mr. Ackermann's contradiction of the popular idea that a steam vessel's boilers invariably burst when the vessel suddenly founders. I have never seen the boilers of a salved sunken steamship showing any signs of ill-effect through the vessel having become suddenly submerged when steam ' was on ' the boilers. I do not think that any marine salvage expert could narrate a contradictory instance to my above statement. This matter has been thrashed out long ago, and I should have thought that by this time the reading public would have been aware of what really does take place, namely, that the clouds of steam which arise on the foundering of a vessel are due (as Mr. Ackermann says) to the flooding of the furnaces.—Yours truly,

" J. Lester Clark, F.R.G.S., M.I.N.A."

Mr. J. L. Clark also wrote on May 11 to the author as follows :—

" Dear Sir,—I think you might like to have the experience of an ex-marine salvage officer in support of your really undeniable reasoning. The theoretical arguments you have given in your letters should convince any ordinarily educated person, but there are always those who will argue black is white, and if for the sake of peace you agree with them, they will then start to argue afresh and say they ' meant pink.'—Yours truly, J. Lester Clark,

" *Late Special Salvage Officer to the Salvage Association.*"

In spite of all this, however, and the fact that the *Daily Mail*, on January 1, 1903, had the little article on " A Boiler-bursting Myth," the fallacy literally *burst* forth again on July 9, 1906, in connection with the loss of the s.s. *Fishren*, at Dover, in giving an account of which the *Daily Mail* of that date said : " She suddenly plunged and disappeared in a cloud of steam, volumes of water being thrown high into the air by the explosion of the boilers " ! While on August 7, 1906, the *Daily Telegraph*, in reporting the loss of the s.s. *Sirio*, mentions three times that the " boilers exploded." In conclusion, we will add it is curious that, however many boilers each of these unfortunate vessels had, they all " exploded " exactly together, which, to say the least of it, would be remarkable if they really did explode.

That Boiling Glass Lamp-chimneys prevents their Cracking

If this were so we may be sure some enterprising firm would have long since thoroughly boiled all their chimneys and advertised the fact, and the public, having found that these particular chimneys never cracked, the firm's name would be as well known as the Bank of England.

No doubt the idea is that the boiling anneals the glass, but it is highly improbable that a temperature of 100° C. (that of boiling water) is sufficient to allow the molecules of glass to adjust themselves so as to relieve any internal stresses produced in the glass during the making of the chimneys, for the melting point of glass is about 1250° C.

That a Chimney Draws

This fallacy persists on account of such expressions as " the heat is all drawn up the chimney " ; " the chimney is dirty ; it won't draw," but these arose through a miscon-

ception of the physical facts. In spite of this misconception we find the true cause implied in the name of the piece of thin sheet iron used for "drawing" up a fire, it being called a "blower." The warm air in a chimney is lighter than the corresponding quantity of cold air outside the chimney, consequently the latter is not balanced by the former, and it forces its way into the bottom of the chimney, some of it passing through the fire on its way. By the use of a "blower," or newspaper, placed over the opening above the fire, a greater proportion of the air is compelled to go through the fire, so that the latter is really blown up.

That Sugar and Vinegar (or Salt) Neutralise each other

To a certain extent they hide one another in the same way that scent may hide an unpleasant odour. In these cases a mere mixing of the substances takes place, but in order to have neutralisation a chemical action must take place such as the neutralisation of an acid (lemon juice) by an alkali (bicarbonate of soda).

That all Chamois Leather is made from the Hides of Animals of that name

Most of the so-called chamois leather is made from sheepskins, and while most leather is preserved by the use of tannin in some form, "chamois," or wash-leather, is prepared by the use of oil.

That if there is a Leak of Gas it should be looked for with a Naked Light

This stupidity holds sway in at least two continents (though it is perhaps not fair to include the United States on only one case personally known to the author, even when that case concerned a clergyman), for in addition to numbers of cases in Great Britain, the author came across one in Cumberland, Maryland, while he was there in 1901. There was a leak of gas in a church. The clergyman sought the leak with a naked light and—found it! In this case the searcher was not badly injured, but his church was wrecked, the roof was blown off, and, besides other damage, one of the gables was blown down. In another case, in London, in the author's bachelor days, he noticed a smell of gas in his first floor room, and went down to investigate in the room immediately below, when to his horror he found his landlord just about to enter that room with a lighted candle

" to look for the escape of gas " ! He *knocked* the candle out and left explanations to a later period ; the windows and door were fully opened to let the gas out, and then it was found the chandelier was short of water. In the course of the deferred explanations we regret to record that the man would not acknowledge the past danger, evidently needing an explosion to convince him, which (as far as the author is concerned) he is now at liberty to have.

Prof. F. H. Hummel, M.Sc., A.M.I.C.E., believes that people think that they are looking for only a *small* leak, and that so long as there is not a large volume of gas present there is no danger. But almost the reverse is true, for while very weak mixtures (about one volume of gas to sixteen volumes of air) are not explosive, a point is reached (about four volumes of gas to one of air) when the percentage of gas in the mixture is too high for it to explode, while the most explosive mixture under ordinary atmospheric conditions is about equal volumes of each. Thus a small leak will keep the mixture within the danger zone longer than a large one, and in this sense is more dangerous than a larger leak.

We will end the notes on this fallacy by a few quotations from daily papers :—

" It is Mr. John Pybus this time. He is a builder of West Hartlepool, and there was an escape of gas in his house. He is not dead ; but only severely burned. He will not look for the next escape of gas with a lighted candle next time. But some other man will."

" The foregoing is a type of anecdote which might always be kept in type for the *Child's Guide to Knowledge,* along with this one : ' Mr. Blank Blank had a revolver in his hand yesterday. He did not know it was loaded. The funeral will take place to-morrow.' "—*Globe,* Nov. 14, 1898.

" Explosion, followed by fire, caused by the venerable, if foolish, practice of ' seeking for an escape of gas with a light,' on Saturday wrecked No. 294, Coldharbour Lane. A man named George Clark (aged 41) was burnt on the left hand."—*Daily Mail,* June 19, 1899.

" Searching for a leakage of gas with a lighted match in a baker's shop at Taunton yesterday, a man caused a serious explosion, which wrecked the premises and injured himself and another person."—*Daily Mail,* April 8, 1907.

" An employé of the Sevenoaks Gas Co. took a lighted match at mid-day to discover a leakage in their offices situated

in the centre of the town. A violent explosion followed, which practically wrecked the office, the plate glass and other windows being blown into the streets. Several people had extremely narrow escapes."—*The Electrical Engineer*, June 5, 1908.

That certain People can 'tell the Fortunes' of others; in other words, that they can predict the chief events in the lives of those persons

"We are simple men; we do not know what's brought to pass under the profession of fortune-telling. She works by charms, by spells, by the figure, and such daubery as this is, beyond our element: we know nothing."—The Merry Wives of Windsor, IV., ii., 161.

This is certainly one of the fallacies which are harmful, if not positively dangerous, and anyone can satisfy himself on this point by reading the evidence of the trials of a few of the leading fortune-tellers who have fortunately placed themselves within reach of the law during the last few years. The chief crusade against them was made by the enterprise of the *Daily Mail*, and we refer our readers to the files of that and other papers of June, 1904, and the end of 1912.

There they will find columns of the most damning evidence against this ignorant and stupid survival from the dark ages, enough, in fact, we should think, to satisfy all who are outside the walls of a lunatic asylum. But from the evidence produced in these fortune-telling cases and those dealing with the hoary confidence trick (not to mention Carlyle's statement to the effect that there are forty millions of people in Great Britain, "mostly fools"), it is obvious that our lunacy laws are very lenient, and that consequently shoals of harmless (?) idiots roam the land and support fortune-tellers and other sharpers.

As a sample of the drivel used (alas, effectively!) in this 20th century for the purpose of extracting money from those lacking a trained brain—or possibly a brain of any sort!—we quote the following from an advertisement issued in Nov., 1910, by a palm-oil-ist in the West End of London:—

"The Greatest Recognised Student of Palmistry.

"She has proved that the lines of the hand are forecasters of events. It is not fortune telling, the influences which mould the will and rule the life can certainly be read and should be used for other than romantic purposes. Health, talents, love and marriage may all be clearly shown and the

power given by this knowledge is great. To know the future is to gain that by which we may master the world. Madame —— has made palmistry a definite science. Accidents are foretold and illness averted, love affairs untangled and everything harmoniously adjusted. Consult Madame —— before beginning business transactions or entering a profession. She can tell you the work you are best suited and adapted for and can direct you on the course you must take to make a success. Family troubles are lightened and the burden of them removed by having advice clearly given. Readings are private and exclusive and all business strictly confidential.

" The hands of children as well as adults should be read, their temperaments and the best way to govern them, makes the path easier for both parent and child. Do not go on in life making blunders and having to suffer for mistakes. Find who your true friends are and if you have social troubles you can be directed rightly through them.

" Do not delay ; come at once and be convinced."

One prosecution worth looking up appeared in the daily papers of Saturday, April 7, 1900, and dealt with a fortune-teller calling herself " Madame Zuleika." She was fined £35, including costs, and the leading article on " Witchcraft Up-to-date " in the *Daily Mail* of that date ends thus :—

" All who have seen below the surface know how too often families are broken up, silly minds are turned, domestic peace destroyed by the mumbled nonsense of these ' seers.' The revelations in a recent divorce case are but typical of what is done a hundred times over."

That this is one of the harmful fallacies is illustrated by the following paragraph which appeared in the *Daily Mail* of Feb. 29, 1908 :—

" Fräulein Auguste Reitzenstein, a beautiful young Viennese dancer engaged at a Berlin music-hall, shot herself through the heart in the studio of her lover, a portrait painter, yesterday, in consequence of a fortune-teller's prophecy that she would shoot herself before she was twenty-three years old.

" The girl was latterly despondent over another ' revelation ' of the fortune-teller regarding the alleged unfaithfulness of her lover. As some minor predictions had come true, the dancer persuaded herself that her inclination to commit suicide was the voice of fate. She purchased a revolver, and made clandestine trips to the Halensee Woods in order to learn the use of the weapon.

" The police are looking for the fortune-teller."

A similar case was reported in the *Globe* of April 14, 1914. Florence Riches committed suicide after having her mind upset by a gipsy fortune-teller, and the coroner remarked, ' They do an incalculable amount of harm these gipsy women and others of the same class ; but even educated people have their fortunes told and seem to believe in gipsies. It does a lot of harm."

Ford, in his *Line of Life*, says : " Deceiving and deceivable palmsters, who will undertake by the view of the hand to be as expert in foretelling the course of life to come to others as they are ignorant of their own in themselves."

Prof. W. Stirling, Dean of the Faculty of Medicine and Professor of Physiology at Victoria University, Manchester, in the course of a lecture at the Royal Institution, on March 17, 1908, said, " Palmistry is an absolute absurdity. The whole thing is beneath contempt. Look at your palms and you will find certain classical lines. These lines, the so-called Lines of Life, Heart and Head, the Girdle of Venus, and the Bracelets of Life round your wrists—what do you suppose they really are ? They are nothing more nor less than creases or folds produced by the action of the muscles. The Line of Heart, for instance, is the flexure of the four fingers, and the Line of Life is the result of the action of the thumb. All these lines that have been given astronomical names by the palmists are characteristic flexures. You will find the same lines on the palms of the orang-outang. Humanity is daily gulled through its extraordinary ignorance of the elementary facts of physiology."

On Oct. 24, 1912, Atarah (Collins) was fined by Mr. Curtis Bennett £20 and £5 5s. 0d. costs for pretending to tell fortunes by palmistry. This was one of many prosecutions by the police in 1912, who then took vigorous measures against a host of fortune-tellers, crystal-gazers, palmists and clairvoyants. On Nov. 4, 1911, Mr. Plowden sentenced ' Prof. Zodiac', *alias* Rupert Scott Blair, who described himself as a phrenologist, to six weeks' imprisonment for pretending to tell fortunes. Mr. Plowden said, " It is high time that this fraud, which has been practised right and left on credulous people, should be summarily put a stop to." On Nov. 29, 1912, Florence Nikola, *alias* Mdme. Ziska, of Electric Avenue, Brixton, was fined at Bow Street £25 and £5 5s. 0d. costs, and

Gould, *alias* Mdme. Astrol, £10 and £1 1s. 0d. costs, both fines being for pretending to tell fortunes.

Much credit is due to the *Daily Mail* for getting the police to take action. In 1911 that paper sent representatives to many palmists, and published the results. These were hopelessly discrepant and usually quite wrong. When right the 'reading' was probably of the personality in general and not of the hand alone.

On June 1, 1915, Mdme. Georgina Tann, of Beauchamp Place, Brompton, was fined £5 and £3 3s. 0d. costs at Westminster Police Court for pretending to tell fortunes, and at the same place, on Nov. 8, 1916, Jane Ledger was given three months' imprisonment in connection with a similar case.

In 1916 the *Daily Mail* renewed its excellent anti-fortune-teller work, and a number of reports by their 'Special Correspondent' were published, to wit, in the issues of Dec. 13, 14, 15 and 27 of that year.

On Dec. 29, 1916, 'Professor' Morgan Melini, palmist, clairvoyant, and astrologer, of Edgware Road, was convicted at Marylebone Police Court of fortune telling, and fined £50 and £10 10s. 0d. costs by the magistrate, Mr. Denman, who, addressing the defendant, said, "You are a charlatan and a humbug. Pretending to be something more than an ordinary human being, you take foolish people's guineas and hand out to them in return a sort of unintelligible nonsense which has been disclosed in this Court to-day. I really cannot sit with patience under this sort of thing."

On May 25, 1917, Elizabeth Mary Porter, aged 69, a clairvoyant, of Queen's Road, Bayswater, was fined £25 at Lambeth for professing to tell fortunes. Sir Chartres Biron, the magistrate, said, "The incredible thing is that any sane person should spend his money on such folly. The longer one sits in these Courts the less one is astonished at human folly. IT SEEMS TO BE ILLIMITABLE."

We have failed to find a word in support of palmistry in that classical work *The Hand*, by Sir Charles Bell, F.R.S., being one of the *Bridgewater Treatises*.

For a most readable account of swindles and swindlers see *Memoirs of Extraordinary Popular Delusions*, by Chas. Mackay, LL.D.

That Boiling Liquids may be poured into Glass Vessels without cracking them if the Bottom of the Vessel be pressed with the Bowl of a Spoon while the vessel is being filled

If the glass is thin there is no need to trouble about it cracking, because the heat is communicated through the glass quickly, the whole expands together, and the vessel does not crack ; but if the glass is thick, the surface of it in contact with the boiling liquid expands more than that remote from the liquid, and a crack is thus caused. Mere pressure would not prevent this action, and the only ray of reason we can read into this fallacy is that if the vessel is not large, and the spoon be a metal one, then metal, being a far better conductor of heat than glass, the boiling liquid will be partly cooled by coming in contact with the cold spoon.

That Sheet Lightning is another kind of Lightning different from Forked Lightning

When a cloud is momentarily brilliantly illuminated and no thunder is heard, the phenomenon is called sheet lightning. This brilliant illumination is caused by a distant forked lightning discharge which is hidden from direct view either by the clouds, a mountain, or the curvature of the earth. This discharge is so distant that the sound of the thunder does not reach us, particularly if the wind be blowing from us. Occasionally we have the sheet lightning appearance, and do hear the thunder to a slight extent.

That the Ventilating Cowls on Ships are Fog-horns

Was it not bluff old Dr. Johnson who defined a ship as " a floating prison in which the prisoners had the chance of being drowned " ? What *would* he have said if the ships of his day had added to their charms by having as many fog-horns as modern ships have cowls, and of the same dimensions too ! What a deaf man's holiday it would be if they all blew at once !

These cowls are for causing fresh air to pass *down* into the lower portions of the ship, and consequently their position is altered from time to time so that they may face the wind.

That a Long Screw-driver *per se* is more powerful than a short one

Generally a long screw-driver is larger than a small one, in which case it does afford a greater leverage ; but the

popular idea seems to be that the spring of the long shank gives the long screw-driver some mechanical advantage. This is erroneous. The " power " of a screw-driver depends on its dimensions at right angles to its length, for the larger the diameter of the handle, the larger the twisting force, or torque, that a given force applied to the handle produces.

Another reason for the common belief may be that long screw-drivers, usually having long as well as large handles, enable both hands to be used in producing the twisting moment.

Mr. Donald Gunn, writing on Sept. 25, 1919, made the following useful note on this subject :—

" Three-fourths of the failures to extract screws are due not to lack of power but to the screw-driver slipping ; every time that it slips, and so injures the slot, the chance of success becomes less. A long (two-handled) tool is held much steadier and therefore slips less. The main cause of slipping is failure to keep the screw-driver in the line of the screw's axis ; and this is more or less inevitable when working in restricted space. Therefore any increase in the length of the tool enables one to lessen this angle of deviation till with a very long screw-driver it is possible to get its axis almost or quite perpendicular to the surface of the work."

Mr. Gunn's note was accompanied by a diagram which makes the last point clear. It is this : Suppose you are putting a screw into the floor close to a wall, and that to enable you to turn your right hand and the screw-driver the centre of the handle has to be kept three inches from the wall, then if you use a screw-driver which is only six inches long, the slope or the angle it makes with the wall will be considerably greater than if a twelve-inch screw-driver is used. This is a fact, and undoubtedly the long driver is an advantage in such circumstances, but the advantage is due, as Mr. Gunn points out, to there being less tendency for the screw-driver to slip out of the slot in the screw. It is not that the long screw-driver *per se* has more ' power ' or leverage.

That an explosion of Gunpowder acts *up*wards and of Dynamite *down*wards

This fallacy could be dealt with as a question of physics, but wherever possible I like to get an authoritative statement on the subject, so wrote to the late Mr. Oscar Guttmann, M.I.C.E., F.I.C., F.C.S., the well known expert on explosives,

and in reply he sent me a copy of his paper on *Explosions and the Buildings of Explosives Works*, read before the Society of Chemical Industry (London Section), on June 1, 1908. The following are excerpts from that paper :—

" The public believe that gunpowder acts upwards, while a high explosive like dynamite acts downwards only. As a matter of fact, both act in all directions. The difference in the effects produced is due to the fact that the explosion takes an appreciable time to be complete in the former case, while in the latter it is practically instantaneous. Consequently, in the case of a slow explosive, the air has time to be displaced, and its resistance is therefore negligible compared to that of the soil, so that the latter is hardly disturbed. With a high explosive, however, the action is so sudden that the air acts like a solid resistance, permitting the soil to receive its full share of the explosive effect." In the discussion of the paper, Mr. A. Marshall, A.C.G.I., said : " Mr. Guttmann was quite right in contradicting the prevalent idea that a high explosive acted downwards and a low explosive upwards."

Mr. Arthur Marshall has since written a monumental work on explosives in which he has probably dealt with this error.

To Mr. Guttmann's explanation perhaps I may add that, in accordance with Newton's third law of motion, " action and reaction are equal and opposite," the force acting on the air must be equal to that acting on the ground in each case. Just as a man cannot exert a push unless he has something against which he can press, so the explosives could not damage the ground unless they had the air and their own gases to press against. The resistance which the air and gases offer is due to their inertia, and is proportional to their mass-acceleration. The mass of air surrounding the explosives in each case is the same, consequently the resistance varies with the acceleration of the air, and this is much greater in the case of high explosives, *i.e.*, the force they exert on the air, and equally on the ground, is greater than in the case of slow-burning explosives.

That to enlarge a photograph or picture *n* times, the enlargement must measure *n* times the length and *n* times the width

This misconception often leads to trouble, for on ordering a photo to be enlarged to double the size, the customer

thinks he will get one twice as long and twice as broad, whereas he finds it is twice the *area* of the original, and therefore not as large as he wished. If the enlargement were to measure twice the length and twice the width, then its area would be *four* times that of the original.

I remember an amusing incident when a friend returned after dinner one night and declared he had seen a cat twice as large as the one then in the room. Most of his hearers immediately imagined that he meant one twice as long, twice as broad, and twice as high, and were naturally somewhat incredulous, for such a cat would have weighed eight times as much as the reference cat. After some explanation, my friend (who was fond of dining well) was able to make himself understood, and his character did not deteriorate any more that evening.

That steel and iron are the same

Iron is a chemical element—that is, it cannot be split up into any other elements—but steel is a chemical compound of the elements iron and carbon, and the physical properties of steel vary enormously with slight changes in the percentage of carbon in the steel. In fact, the whole range is only from 0·2 per cent. to 1·5 per cent. If there is less than 0·2 per cent. of carbon with the iron, the metal acts for all practical purposes as wrought iron, while if the percentage exceeds 1·5 per cent., then cast-iron is obtained. Some cast-iron is not only a compound of carbon and iron, but contains also some free carbon.

The so-called mild steel, which is so largely used for engineering work, is not steel, but iron made by the Bessemer process.

That the so-called ' Sweat ' which sometimes appears on cold water Pipes and Walls actually exudes from them

This ' sweat ' appears when the weather suddenly turns warm after having been cold for some time, but if the pipes and walls ' sweat ' because they feel oppressed by the heat, how is it that *hot* water pipes never sweat ! The phenomenon is merely a practical illustration of that known to meteorologists as the dew-point. There is always invisible water-vapour present in the atmosphere. The

amount that can remain invisible depends on the temperature of the air. The warmer the air the more moisture it can absorb. If it is fully saturated the relative humidity is said to be 100. The average amount is 75 per cent. of complete saturation, and the relative humidity is then said to be 75. During a long spell of cold weather, the water in reservoirs and the walls of buildings become cold, and the quantity of aqueous vapour in the atmosphere is small. Then the weather suddenly turns warm, and the quantity of vapour in the air is consequently greater. This warm air comes in contact with the cold walls and cold water pipes, and its temperature is so much reduced that it cannot retain all the water in suspension, so it condenses on to the pipes and walls. If the walls are painted, thus rendering them non-absorbent, the moisture remains on the surface and is seen. Cold water pipes, being made of metal, are, of course, non-absorbent.

That if in the case of a conflagration there is no smoke, then there is no danger of suffocation

Smoke is a mixture of many gases, with particles of matter (solid and liquid) in suspension. The most dangerous of the gaseous constituents are carbon monoxide (which is very poisonous) and carbon dioxide. In the case of coal smoke the particles in suspension (which form the visible smoke) are chiefly carbon and tar, and while large quantities of them would be harmful to inhale, they would not be anything like so dangerous or suffocating as the two *invisible* gases—carbon monoxide and carbon dioxide; and it is entirely erroneous to suppose there is no danger if the products of combustion are invisible. There are at least three types of cases of suffocation by the products of combustion, the whole of which are invisible :—Those in connection with (1) lime-kilns ; (2) gasheated geysers for warming bath-water (when no proper chimneys are fitted) ; and (3) fermenting vats.

That the greater the proportion of Coal-gas in a mixture of Coal-gas and Air, the more violent the explosion will be if the mixture be ignited

Sir Dugald Clerk, K.B.E., F.R.S., M.I.C.E., M.I.M.E., in his book, *The Gas Engine*, gives the results of some experiments which he made. Some of his results are tabulated below :—

Mixture.		Max. Press. above atmos. in lb. per square inch.	Time of Explosion in fractions of a second.
Gas	Air.		
Vols.	Vols.		
1	4	80	0·16
1	5	91	0·055
1	6	90	0·04
1	7	87	0·06
1	9	78	0·08

The gases were exploded in a closed vessel. The temperature before explosion was 17°C., and the pressure before explosion was atmospheric. Thus when the proportion of air is increased from four to five volumes per volume of coal-gas, the resulting explosion is increased from 80 lb. square inch to 91 lb. square inch ; and even when the quantity of gas is still further reduced to only one volume to six of air, the resulting explosion is practically the same, while if the quantity of air is increased to nine volumes to one of gas, the maximum pressure due to the explosion is only *slightly* less than when the mixture is four of air to one of gas, although the latter mixture contains more than double the quantity of gas.

That the Keystone of an Arch is the most important voussoir in the Arch

It is not clear in what sense the keystone is considered the most important. If it is thought that the keystone is subjected to a greater force than the other voussoirs, then this is the cause of the error, for the forces on the keystone joints are *less* than those on any of the other joints. Again, the name may be the cause of the error, *i.e.*, if it be thought that the keystone is the key to the situation ! Architects frequently make an artistic feature of the keystone, and in so doing it is made larger than the adjoining stones. This may have given rise to the idea that it is more important. As a fact, however, all the voussoirs are equally important, for if anyone of them fail, it is most probable than the whole arch will fail as the result. If anything it might be argued that the bottom voussoirs in each limb of the arch were the most important pair, for the forces on them are greater than those on any other pair and for this reason they are often made larger than any other pair. It would be no more

correct to speak of any one link of a chain as the most important, for if *any* link break, the whole chain has failed to sustain the force put upon it. Here again it is true that according to circumstances some links may have greater forces to sustain than others, but it is equally important that all the links should withstand the forces to which they are subjected.

That mass and weight are the same

Mass is ' quantity of matter ' while weight is the force by which bodies are attracted to the earth. The confusion is very widespread, even among students at technical colleges, and is largely due to the fact that the unit of mass is one pound and the common unit of force is also one pound. Prof. Worthington has made the excellent suggestion that when force is meant we should use the contraction ' *pnds.*,' and when mass is meant, ' *lb.*'

Mass and weight are absolutely different, the only connection being that in ordinary circumstances all matter has one property in common, viz., it is attracted to the earth, and this earth-pull on a body we call its weight, but if the body be taken into interstellar space, or better still, if the universe be annihilated and only the body be left, then it will not have any weight, while its mass will remain unaltered.

We realise the properties of mass (matter) by several of our senses, but we have only one sense by which we are able to comprehend a force, *e.g.*, if the mass happens to be a very ripe piece of Gorgonzola cheese we can see it, taste it, smell it, and touch it, but we cannot see, taste, smell or touch a force. Nor can we hear it. If, therefore, the popular idea were correct that we have only five senses, we should be as little able to comprehend a force as we are a fourth dimension.

Three illustrations of the difference between mass and weight must suffice. An old woman going up a hill with a sack of flour on her back for the week's baking would gladly part with the *weight* of the flour. She might even pay you a trifle to take the weight away, but she certainly would not let you take the *mass* unless you paid her. Again, when you eat your eggs and bacon for breakfast it is the *mass* of them that interests you (I do not suggest you gormandise !) and not their weight. They would be just as satisfying—perhaps more so—on the top of a high mountain, where their weight would be less. Lastly, when we open a large iron gate (if it is properly hung and the hinges are well greased) it is the

mass (or its inertia), with which we have to deal, but if the gate were lying on the ground and we tried to lift it we should have to deal mainly with its *weight*.

That the gradient of a railway is expressed in terms of the length of the slope, *i.e.*, that it is the sine of the angle of the slope which is given

A slope of " 1 in 50 " is represented by a diagram which shows the 50 feet measured horizontally and the 1 foot rise measured vertically. The ratio 1/50 is the tangent of the angle of inclination. 1/50 is also called the slope. The erroneous idea is to think that the 50 feet is measured along the slanting line, though it is true that the difference is very small whichever way the slope is measured in the case of *small* gradients, but this is not so in the case of a rise of, say, 1 in 5.

That when passing a lamp-post at night a person's shadow travels away from him faster and faster as the shadow gets longer and longer

Let L be the lamp of a lamp-post LB.

Let H_1 and H_2 be two positions of a man's head as he walks from the lamp-post with velocity v.

Let S_1 and S_2 be the corresponding ends of his shadow.

Let T be a point on the lamp post such that TB is equal to the man's height. Then, as the man walks from the lamp-post, the beam of light LS_1 is rotating in the plane of the paper about L, while H_1 is moving horizontally along the line TH_2 with a constant speed v. By similar triangles LTH_1 and LBS_1 the speed of the shadow is to the speed of the man as LS_1 is to LH_1 which is equal to LB : LT and this is constant. When the man has got to H_2 the shadow is at S_2, where again the speed of the shadow is to the speed of the man as LS_2 is to LH_2, which again by similar triangles = LB : LT = const.

That damp air is heavier than dry air

This fallacy may have arisen from it having been noticed that fogs aften lie in hollow places, but this should have been corrected by the well known fact that in wet weather the weather-glass is said to " fall," *i.e.*, the pressure of the atmosphere is not able to support so long a column of mercury, hence the weight of the atmosphere pressing on the column is less.

A more direct proof is to weigh a volume of dry air at a temperature of, say 60° F., and at atmospheric pressure (30 ins. mercury). If this be done it will be found that about 13 cubic feet of air weigh 1 lb. If now an equal volume of water vapour at the same pressure and temperature be weighed, it will be found to weigh only about 0·62 lb.

The fact of fog sometimes lying in hollow places may still present a difficulty until it is pointed out that water-vapour is really steam at atmospheric temperature and pressure. It is, like steam, invisible, and practically conforms to the laws of the permanent gases. Clean fog (*i.e.*, without soot and tar), on the other hand, is not a gas, but a mixture of air and very small spherical particles of matter, and is very often heavier than air. We could not live if we had only water-vapour to respire, whereas there is not much inconvenience when we respire clean fog.

That radiant heat is not given off by steam and hot-water pipes

It is true that the hotter a body is the more radiant heat it gives off, radiation varying as the fourth power of the absolute temperature of the body. In the case of a piece of red hot iron or other incandescent body, light rays are given off as well as heat rays, but there is no essential difference between these, both being forms of radiant energy, the ether-waves differing among themselves only in wave-length. Strictly speaking, radiant heat or radiation is not heat, and it is not until this radiation impinges on a body and sets its molecules vibrating that we have heat properly so-called (sensible heat) from the physical point of view. The most familiar example is that of the sun. All the heat the earth receives from the sun is transmitted in the form of radiation, which passes through the air without appreciably warming it, but when it strikes, say, a piece of iron it may raise its temperature so much that it cannot be held in one's hand. Interstellar space is almost devoid of heat, and this accounts for the tops of some mountains being perpetually snow-capped. Thus all bodies which are above the temperature of absolute zero radiate heat. An important instance of radiation occurs in connection with the radiation from the walls of rooms, which are certainly not red hot! If we are in a room with warm air and cold walls we feel cold, but if the walls are warm and the air comparatively cold, we feel comfortably warm.

That the mass centre and centre of gravity of a body are always the same

It is true that in most cases of bodies on the Earth their centre of gravity is practically coincident with their mass centre, but for all this there is a vital difference between the two points.

A diagram is necessary, hence draw a circle from centre C and having a radius r. Let A be a point on the circumference. Draw a long thick line AB from the circle, the angle CAB being say about 120°. Bisect AB in M. With centre C and radius $2r$ cut AB in P. With centre C and radius $3r$ cut AB in Q, and lastly with centre C and radius $4r$ cut AB in B. Then let the circle of radius r represent the Earth, and the thick line AB a *very* long uniform bar of steel, both to the same scale. Consider a short length of the bar at A weighing 1 lb. Then by the law of attraction due to gravity, the Earth-pull, or weight, of a similar mass at P will be only $\frac{1}{4}$ what it is at A. Similarly the pull on another mass of 1 lb. at Q will be $\frac{1}{9}$ lb., and at B, $\frac{1}{16}$ lb. Consequently if a knife-edge had to be provided on which the rod AB would balance in the position drawn, it would have to be placed at some point G between A *and* M., *i.e.*, AG would be less than half the length of the rod. G would be the centre of gravity of the rod, but its mass centre would be at M. The centre of gravity is a particular point in the line of action of the resultant of all the forces due to gravity acting on the body, while the mass centre is the geometrical centre of a uniform body and is unaffected by any external forces which may act on the body.

That a cast-iron bar with the "skin" on, one inch in diameter, is stronger than a cast-iron bar without the "skin" on, which is also one inch in diameter

The so-called "skin" is a layer of very hard chilled cast-iron, caused by the metal coming in contact with the cold walls of the mould, which is usually made of loam or foundry sand (a mixture of sand, coal-dust and dung), but is made of cast-iron when it is desired to have a chilled casting as in the case of some projectiles.

This sudden solidifying of the outside layers while the centre is still molten or very hot, causes internal stresses to be set up in the casting, and great precautions have to be taken to avoid this effect, for in the majority of cases

it would weaken the structure as regards its resistance to external forces. Hence, we see that even a plain bar may be weakened by this action, and Prof. Unwin, F.R.S., *Testing of Materials of Construction*, p. 266, says :—" There is a popular impression that it weakens a bar to take off the skin. This is almost certainly erroneous."

That any Angle can be Trisected Geometrically

Sometimes this is stated by saying it cannot be done by Euclidian methods, which means it cannot be done by the use of only compasses and ruler. Although we know this cannot be done, we do not know how to prove that it cannot. To prove a negative is always more difficult than to prove a positive. It is, however, easy for anyone who disputes the fact to send to us his method of performing the problem, when we expect to be able to point out where the method fails. Let us be quite clear. We do *not* state that for practical purposes angles cannot be accurately trisected, but that it cannot be done by Euclidian methods. For a neat method, very nearly Euclidian, see that of Mr. F. T. Llewellyn, in *Engineering News*, of Jan. 4, 1906. It was reproduced in *Le Gênie Civil*, p. 404, of the same year.

That it is possible to construct a Machine which would give out more Power than was put into it

There is a large number of fallacies based on the principle here involved, which is the same as that of perpetual notion. Technical education is doing much to sweep away such cobwebs, but it still has a vast field of work, as is testified by bicycle chains and cranks which, the gullible cyclist is told, " increase the power." Some time ago the writer was consulted with regard to the invention and patenting of several couplings, by which a horse (according to the inventor) would be enabled to pull a railway train along ! One of these is very ingenious, indeed, it almost deserves the title of " paradox," and this made it all the more difficult to explain to the inventor why it would not work. Not having a mechanical mind he was unable to realise the universal principle of the *conservation of energy*. Had he been able to do so, it would have been quite unnecessary to demonstrate to him why that particular mechanism could not *possibly* do what it certainly at first sight *appeared* as if it could do, even to a mechanician.

The true appreciation of the principle of the conservation of energy cannot be imparted in a few lines; it can only follow, as a matter of course, the careful study of mechanics *ab initio*. It should be possible, however, for us to give the reader a fairly clear idea of what is meant by the term "power" in this, its technical, sense. To do this we must explain the term "work." Work is done when we lift a weight, say, of fifty pounds, from the floor on to the table, and the amount of work so done is measured by the product of the weight into the vertical height through which it is lifted. Thus, suppose the table to be three feet high, then the *work done* is 50 lb. × 3 ft., *i.e.*, 150 foot-pounds of work. Now, nothing has been said of the *time* it took us to lift the fifty pounds from the floor on to the table. A man could lift the whole fifty pounds at once, and place it on the table in, say, two seconds; but a boy of ten years of age could not lift the whole fifty pounds at once; he could, however, take five pounds of it at a time, and so place it all on the table. Suppose it take him also two seconds to lift five pounds up on to the table, and one second to bend down ready to pick up the next five pounds weight, then it would take him 10 × 3 seconds, *i.e.*, thirty seconds to place the whole fifty pounds on the table. The total *work done* in the two cases is identically the same, and yet there is obviously a difference between the two performances; this difference is in the *times* taken by the man and the boy, the latter took fifteen times the time that the former did, and hence we say the man worked at fifteen times the *rate* that the boy did, and the *rate of doing work* is called the *power*. Thus in the above the man did 150 foot-pounds of work in two seconds, and the boy did 150 foot-pounds of work in thirty seconds. Divide the work done in each case by the time taken in each case, and we have the work done per second. These quantities $\frac{(150 \text{ ft.-lb.}}{2 \text{ secs.}} = 75$ foot-pounds per second for the man, and $\frac{150 \text{ ft.-lb.}}{30 \text{ secs.}} = 5$ foot-pounds per second for the boy) are measures of the power exerted by the man and boy respectively. A horse-power is, by convention, 33,000 foot-pounds of work done *per minute*.

Energy is "capacity for doing work," and, briefly, we might say that by the "conservation of energy" we mean that we cannot get something for nothing—in other words, if a machine is supplied with a certain amount of energy, then you cannot by any possible means get more than that quantity of work out of the machine.

That if church steeples, factory chimneys, and other tall structures do not sway they are unsafe

It would indeed be interesting to know how this idea originated. The only possible clue the author can think of is a fable which he heard in his childhood about an oak tree, a bulrush and a strong wind. The bulrush swayed to leeward and allowed the wind to pass over it. (This typified a humbleness of spirit!) The oak was proud and haughty, and said it would not bend, so the wind broke it. Whatever truth there may be in the moral, the illustration is scarcely a fair one, for the surface exposed to the wind in the case of the oak was very much larger, even in proportion to its diameter, than in the case of the bulrush, though it is true that the bending of the latter would reduce the bending-moment (and therefore the tendency to break) due to the wind, because not only would the surface exposed to the action of the wind be reduced, but also the height at which the resultant force of the wind would act. This reduction of the bending-moment would be appreciable only in cases like that of the bulrush, where the vertical height of the structure was materially decreased, and would be entirely negligible in the case of church steeples and the like. The bending-moment is the product of the resultant wind-pressure into the height above the ground at which this resultant acts.

Suppose three solid columns to be constructed respectively of hard bricks set in cement, mild steel, and cast steel; then for a given wind pressure the brick column would bend more than the mild steel one, and the mild steel would bend more than the cast steel, but surely no one would believe that therefore the brick column was the safest?

If a body has to be subjected to a given deformation, then the most elastic is the least likely to break, but this is quite another case, because the forces producing the deformations are not equal, the most elastic body requiring the least force.

In connection with this fallacy it is interesting to know that the principle of the modern seismograph is embodied in

the structure of pagodas many centuries old. Every five-storied pagoda has a heavy mass of timber suspended inside it from its roof and reaching nearly to the ground. During earthquake shocks this mass tends to remain stationary, and so counteracts the sway of the structure, which settles back safely on its base. To understand the action, suppose the top of the pagoda sway to the right, then at first the mass tries to remain behind, and so prevents the top of the pagoda swaying as far to the right as it otherwise would have done. The point of support of the mass now being to the right, the mass swings over to the right, but in the meantime the effect of the earthquake has been to sway the pagoda to the left. The mass again lags behind and thus prevents the pagoda moving so far to the left as it otherwise would have done. Then the mass swings to the left while the top of the pagoda moves to the right and so on.

The following is an extract from *Nature*, Aug. 1, 1918 :—

"VIBRATIONS OF TALL CHIMNEYS.

"Experiments on three chimneys of concrete reinforced by steel rods are described in a valuable paper by Prof. Omori, published in the Bulletin of the Imperial Earthquake Investigation Committee (Vol. 9, 1918, pp. 1-29). One of these chimneys, erected by the Kuhara Mining Co., at Saganoseki, is the tallest in the world. It is 550 ft. in height, 42 ft. 8 in. in diameter at the base and 27 ft. 5 in. at the top, the thickness of the wall being 29½ in. at the base and 7 in. at the top. The total weight of the structure, including the foundation, is 9,500 tons, and the pressure of the shaft on the ground below is three tons per square foot.

"When the chimney was finished measurements were made on five days (Dec. 22-26, 1916) by means of two hoizontal vibration recorders fixed to the top of the wall. The wind at the top attained a velocity of 24 metres per second on the first day and the high value of 35 metres per second on the last ; on the three intervening days it never exceeded 7 metres per second. With the latter velocity the vibrations of the chimney were insignificant, but they increased rapidly with the strength of the wind, the range (or double amplitude) being 20 millimetres in the direction of the wind and 186 millimetres at right angles to it. The period of the vibrations was almost constant, and varied from 2·52 to 2·58 seconds, the maximum acceleration on December 26 being 565 millimetres per

second per second, or nearly one-third more than that of the semi-destructive Tokyo earthquake of 1894."

The remarkable fact here recorded is that the maximum vibration took place *at right angles* to the direction of the wind !

That a semi-circular arch produces no outward thrust on its supports

Henry Adams, M.I.C.E., M.I.M.E., in his paper on " The Stability of Arches," read before the Civil and Mechanical Engineers' Society on Feb. 4, 1909, said, " It is commonly supposed that as a semi-circular arch has a horizontal bearing there will be no outward thrust, and only a vertical load on the supports. This, of course, is wrong, as all practical conditions of loading give of necessity an outward thrust. Action and reaction are equal. The horizontal thrust at the crown gives rise to an equal horizontal thrust at each of the supports." There is nothing to add to this except perhaps to emphasise the last sentence which should make the matter clear.

That falling bodies must necessarily come down base first

An article signed " W. M. M.," which appeared in the *Electrical Review*, Jan. 18, 1907, drew attention to this fallacy in the following words : " Before all things it is necessary that he [the young engineer] build on a sure foundation of dynamical and mechanical principles, and if in this respect his education has been hurried or neglected he will have time to remedy the defect by underpinning. Thus he will have a touchstone by which to try much of the technical literature he meets with, and will pay little regard to the man who tells him, for example, that meteors, lampshades, and other falling bodies, must need come down base first. There is a well known experiment of letting a sovereign and a feather fall *in a vacuum*, which proves that all falling bodies, whatever their shape or density, fall with the same speed.

Another experiment to illustrate the same phenomenon is that of placing a piece of paper about the size of a threepenny-bit on top of a penny or half a crown, and then allowing the latter to drop, care being taken to let go of it in such a manner as to allow it to remain horizontal throughout its whole fall. It will be found that the light piece of paper remains on the coin and falls with it, the reason being that the coin protects it from the influence of the air. It is sometimes argued that

the falling coin produces a partial vacuum on its upper surface and that this holds the paper on. This statement can be disproved by holding the coin with the paper on it between the fingers and thumb and then drawing it vertically downwards with a greater speed than it would fall naturally. The paper is then left behind because it can fall only at the speed determined by the law of falling bodies.

Bodies falling in air are affected by the resistance of the air and this resistance increases rapidly as the speed increases. The effect of the air depends also on the shape of the body. *e.g.*, a shuttlecock is designed to fall in a particular way. The feathers offer greater resistance (compared with their weight) than the body of the shuttlecock, and hence they drag behind, but any body which offers the same resistance to the air, whatever its position in falling, will fall in any position without changing that position, for every particle of any body is equally attracted by the earth, and consequently in falling all particles obey the same law and attain the same speed in the same time.

That the rate at which heat passes from the hot gas to the water in a boiler varies directly as the difference of their temperatures

Mr. C. H. Wingfield, M.I.C.E., M.I.M.E., M.I.N.A., dealt with this fallacy in his paper on " The Efficiency of Boiler Heating Surface " read before the Civil and Mechanical Engineers' Soc., April 2, 1908 [p. 109 of the Transactions of that Society for the Session 1907-8], wherein he says, " A ' popular fallacy,' almost worthy of inclusion in your Hon. Secretary's book on the folly of mankind [you see the hint has been taken and this fallacy *is* now in the book !], is the belief that the rate at which heat passes from the hot gas to the water in a boiler varies directly as the difference of their temperatures. This idea was undoubtedly strengthened, if indeed it was not originated, by a misunderstanding of Prof. Rankine's statement to the effect that ' the rate of conduction through a flat layer of uniform thickness is simply proportional to the difference between the temperatures of the two faces of the layer and inversely to its thickness.' Rankine was here speaking, however, of what happens *in* the substance of the plate after the heat has entered it, and during its passage through it. He did not refer to the difficulty with which heat leaves hot gas and enters the plate ;

a difficulty owing to what may be called ' surface resistance.' The nature and exact reason for the existence of this surface resistance is very obscure, but as will presently be seen it plays a very important part in determining the total resistance which a boiler plate offers to the passage of heat from gas to water. One suggestion which has been made is that, after giving up part of its heat, a layer of gas remains in contact with the heating surface, and serves as a non-conducting lagging which impedes the transfer of heat by conduction from the hot gas, although not interfering with the passage of radiant heat. . . .

" Prof. Rankine pointed out that the rate of transmission from gas to water *per degree of difference* is simply proportional to the difference of their respective temperatures. At first sight this may appear identical with what the author has called a popular fallacy, viz., the statement that the transmission from gas to water is simply proportional to the difference of their respective temperatures. The words in italics make all the difference. The transmission per degree difference has to be multiplied by the number of degrees of difference in order to obtain the [total] rate. Hence the real rate of transmission varies as *the square* of the difference of temperatures of gas and water. Prof. Rankine expressed this in the following formula :—

$$Q = \frac{(T - t)^2}{a}$$

where, Q = units of heat transmitted per hour per sq. ft. of heating surface ;

T = the temperature in °F. of the gas ;

t = the temperature in °F. of the water ;

and a is an empirical constant found by experiment to vary from 160 to 200 in steam boilers."

To this nothing need be added, except perhaps a note on the last paragraph. Let q be the rate of transmission of heat from gas to water in British Thermal Units per square foot per hour per °F. of the difference of their temperatures. Then Rankine stated that q varies as $(T - t)$ °F. Hence we may write $q = k\,(T - t)$, where k is some constant, and the *total* quantity of heat transmitted per sq. foot per hour will be the rate per degree diff. × the total diff. $= q \times (T - t) = k\,(T - t)^2$,

where $k = \frac{1}{a}$ in Rankine's formula.

In the case of warming buildings by hot water, the reverse process takes place, *i.e.*, heat is transferred from a liquid to a gas, and in some careful experiments the author made in the Nurses' Home of the Hospital for Sick Children many years ago, he found the rate of transference of heat from unpainted cast-iron hot water radiators to the air was 1·93 British thermal units per sq. ft. of radiator per hour per ° F. difference of temperature between the water and the air. (The mean temperature of the radiators was 201° F., and the mean temperature of the air surrounding them was 81° F.)

That the chief cause of boiler explosions is shortness of water in the boiler, and that if feedwater be let on to a red-hot furnace crown it will cause the boiler to explode

The following are quotations from the Report, dated Dec. 10, 1889, of the then Chief Engineer, Mr. Lavington E. Fletcher, of the Manchester Steam Users' Association, on a series of " Red-hot Furnace Crown Experiments " to ascertain the result of injecting the feedwater into a boiler when short of water with fires burning.

" The idea that nearly every explosion is attributable to shortness of water has been very generally entertained for a considerable number of years, and has had a very mischievous tendency. It is true that some explosions arise from this cause. If the furnace crowns are rendered red-hot, the plates become so weakened thereby that they may rend at the ordinary working pressure of steam. . . . The investigations of the Association, however, show that explosions from shortness of water form but a small proportion of the total number and that they do not exceed more than one in six. . . . It has been thought that if the furnace crown of a boiler were laid bare and allowed to become red-hot, and then the feed turned on, so large an amount of steam would be instantaneously generated that the safety-valves would be unable to carry it off, and the increase of pressure would be so sudden, and so great, that the shell would be burst open and the boiler blown to pieces. . . .

" In the year 1839, Capt. Pringle, R.E., and Mr. Josiah Parkes, M.Inst.C.E., were appointed by the Lords of the Committee of the Privy Council for Trade to undertake an inquiry into ' the causes of steam-boat accidents.' . . . the Commissioners state :—' It is attributed with great apparent reason to the *instantaneous disengagement of an*

immense volume of steam produced by the oscillation or listing of the vessel, the boiler, a rectangular one, being at the time short of water, and the upper plates of the furnace on the higher side of the vessel being probably red-hot, or nearly so. *No ordinary number of safety-valves could have liberated the amount of steam generated. . . .'* The well known engineer, the late Mr. John Scott Russell, builder of the steamship *Great Eastern*, stated in his evidence :—' If the water in a boiler gets too low, the furnaces are uncovered and become red-hot, and thus when the time of starting occurs, the motion of the vessel and the action of the pumps raise the water on to the red-hot metal, and *steam is generated so rapidly that an explosion almost inevitably ensues. . . .'*

" The celebrated engineers, Messrs. Maudsley and Field, of Lambeth, London, endorsed this view. . . . The Manchester Steam Users' Association considers the foregoing views to be erroneous, and though they may have been modified by the scientific men who first enunciated them, and in all probability were so modified as experience in the use of steam and in the investigation of steam boiler explosions increased, yet they took deep root in the public mind, and have continued to be generally entertained to the present day."

" . . . To throw light on this subject, the Manchester Steam Users' Association, as long ago as 1867, conducted some experiments to ascertain the result of injecting cold water into some circulating household boilers when red-hot, and *found that no explosion resulted."*

In the summary of his report on the whole of the experiments, Mr. L. E. Fletcher says, " The results obtained showed that showering cold water on to the furnace crowns when red-hot *did not lead to their rending by a sudden contraction either transversely or longitudinally, nor did it lead to a violent generation of steam which the safety-valves could not control and the shell could not resist.* On the injection of the feed when one of the safety valves was seated and the other open, the pressure rose in $1\frac{1}{4}$ mins. from 6 lb. to 12 lb., and when both safety valves were seated it rose in $\frac{3}{4}$ mins. from 6 lb. to 27 lb., and then gradually fell. On the injection of the feed, when the safety valves were blowing, *no increase of pressure could be observed.* On the contrary it began to fall. *There was no collapse ; there was no rent, either in the furnace tubes or in the shell, and no movement of the boiler whatever. . . .*

" The experiments, as far as they have been carried, lead

to the conclusion that in the majority of cases turning on the feed, when delivered behind the fire bridge, would be the best thing to do. . . .

"These experiments clearly put to rout the generally entertained opinion, that showering cold water on to red-hot furnace crowns would cause the 'instantaneous disengagement of an immense volume of steam,' which would act 'like gunpowder,' overpowering the safety valves, however efficient. . . . ."

The specific heat of water is about *nine* times that of iron, and the latent heat of steam is 966 British thermal units per lb., so that a small quantity of cold water would absorb the heat from a large amount of iron or steel, especially if the water were volatilized in the process.

That the pressure on each of the smooth pegs D and C, in the arrangement described below, is greater than on any of the other pegs

[A B C D E F G H* is a regular octagon in a vertical plane, O is its centre. A B is the vertical side on the right, and E F ditto on the left. C D is the top horizontal. The pegs at A B C D E F are supposed to be frictionless. A light smooth cord is placed round them and the ends of it are attached to the ends of a heavy uniform horizontal rod G H of weight W.]

The pegs being smooth, the tension in the cord is the same throughout. The angles of a regular octagon are equal. Therefore the results of all such pairs of forces as E F and E D, and D E and D C are equal, and, of course, they bisect the angles F E D, E D C, &c. Hence the pressure on each of the six pegs is the same.

Another way of considering the problem is to join O, the centre, to all the angles. Then the pressures on the pegs are in the direction of and proportional to F O, E O, D O, &c.

That in the experiment of blowing-out a candle-flame by means of a soap-bubble, blown in the usual manner, the extinction is due solely to the surface tension of the bubble

The following is part of the entry in my diary for Wednesday, Dec. 16, 1896, "To the Conversazione of the Royal College of Science which was held in the Western Science

* Taken counter-clockwise, and A being below B.

Galleries, we heard Prof. C.V. Boys, F.R.S., on ' Soap Bubbles ' (with experiments)—it was enchanting ! Home 0.15 a.m. and made a few experiments to test my idea of the cause of the candle-flame being put out." One of the many experiments shown by Prof. Boys was that referred to in the heading to this article. The next day a few more experiments were made, and on the strength of them I wrote to Prof. Boys asking him whether he had ever blown out a candle-flame by means of a soap-bubble blown with pure air, and whether his breath did not contain the usual $4\frac{1}{2}$ per cent. by volume of carbonic acid gas, as it appeared to me that this gas greatly assisted the extinguishing.

Prof. Boys' reply was as follows :—

" Royal College of Science, London,
" South Kensington, S.W.
" *18th Dec., 1896.*

" Dear Sir,—Your letter is very much to the point. Of course I, as everyone, know that CO_2 is produced in the lungs, but I had not appreciated that the amount of CO_2 and deficiency of O was so great as it undoubtedly is, or that its effect on the burning of the candle (in spite of mining experience) was, as I now find it to be, so important in the experiment that I showed. I find, however, that a bubble blown by bellows air can be made to blow out a candle, but the experiment is not easy and would not be suitable for a lecture, unless, perhaps, a special form of pipe were arranged which I think possible.

" I am much obliged to you for your letter as I have always made a point of strict accuracy in all experimental lectures, and I shall not, in future, fail to point out that the vitiation of the air is a factor in the experiment. I will also make a note in a new edition of my soap-bubble book long promised but as far off as ever.

"The ether flame experiment is a curious anomaly, but here there is more pure air to help.

" I believe I am in very good company in my carelessness. This shows the danger of appropriating any experiment, however old and well known, without examination *de novo*."

The experiment demonstrating the effect of the CO_2 was shown by me to the Physical Society of London at Burlington House, on Oct. 29, 1897, and subsequently at other places.

That the tension on the studs of a cylinder cover is greater when there is steam-pressure in the cylinder than when there is not

This will be best illustrated by an example. Suppose the effective area of the cylinder cover is 150 sq. ins., that it is held on by 10 studs and nuts, that the steam pressure is 100 lb. per sq. in., and that the initial tensile force on each stud (when there is no steam pressure in the cylinder) is 2,000 lb. This initial tension on the studs is caused by screwing up the nuts hard against the cover. The nuts push the cover against the end of the cylinder, and action and re-action being equal and opposite, the cylinder pushes the cover, and thus arises the tension in the studs.

The pressure of the nuts on the cover must be resisted by something, but it does not matter whether the cylinder supplies the whole of the resistance or whether it is partly supplied in some other manner, thus when steam is admitted into the cylinder it presses on the cover *and relieves some of the pressure between the cylinder and the cover.*

We may express the facts in the form of an equation thus :—

Total pressure of nuts on the cylinder cover (=total tension in the studs)= the total pressure of the cylinder on the cover + the total pressure of the steam (if any) on the cover. It must be remembered that for practical reasons the total pressure of the steam must never be so great as the total initial pressure of the nuts on the cover, for if this were so we see by the equation that the pressure between the cylinder and the cover would then be nil, and if this were so the jointing material between the cylinder and the cover would be blown out.

To continue with the example we began with, suppose steam at a pressure of 100 lb. per sq. in. be admitted into the cylinder, then the total force, due to the steam pressure, tending to lift the cover off the end of the cylinder would be $150 \times 100 = 15{,}000$ lb. The total force holding the cover on would be 20,000 lb. (*i.e.*, 2,000 lb. on each of 10 studs), and the difference between these, namely 5,000 lb., is made up by the remaining pressure of cylinder on the cover, for whether there is steam pressure or not, the total force holding the cover on must be equal to the total force tending to push it off (action and re-action being equal and opposite). Hence when there is no steam pressure in the cylinder it is the end

of the cylinder which re-acts against the pressure of the nuts on the studs, but when there is steam pressure, then the end of the cylinder is relieved of that part of the re-action (*i.e.*, there is less pressure on the jointing material) which the steam takes.

The effect of the temperature of the steam, and the difference between the coefficients of expansion of mild steel (of which the studs are made) and cast iron (of which the cylinder and cover are made) is another matter, but it will practically not affect the results arrived at in the foregoing argument.

That the sensitiveness of moving coil electrical instruments increases proportionally with the strength of the magnetic field used

Prof. T. Mather, F.R.S., M.I.E.E., writing in *The Central* for April, 1910 (the number issued as a memorial of Prof. W. E. Ayrton, F.R.S.), says :—

"It is commonly supposed that the sensitiveness of moving coil instruments increases with the strength of the magnetic field used, but this is by no means the case owing to magnetic matter, which is always present in insulated wire ; the sensibility is limited by this fact, and increasing the field strength may decrease instead of increase the sensibility. To overcome this difficulty means of removing the magnetic material were devised, and an increase of absolute sensitiveness of 1,000 per cent. in many cases was rendered possible."

That the indications of moving coil electrical instruments are not affected by the Earth's magnetic field, and are practically uninfluenced by the fields existing in the vicinity of switchboards.

Prof. T. Mather, F.R.S, M.I.E.E., writing in *The Central* for April, 1910, says :—

"Another popular fallacy regarding moving coil instruments is that their indications are not affected by the earth's magnetic field, and are practically uninfluenced by the fields existing in the vicinity of switchboards ; also that the forces made use of in instruments of this type render them immune from electrostatic troubles. These ideas were proved to be incorrect in 1892. Reversal of the position of a Weston voltmeter in the earth's field produced a difference in reading of nearly 1 per cent. for the same voltage, and the accidental rubbing of the glass of an ammeter by the coat sleeve varied

the reading by as much as 5 per cent. of the full deflexion. These defects led to the invention of ' astatic station voltmeters ' of the moving coil type and to the use of 'transparent conducting screens for electrical and other apparatus ' for preventing electrostatic errors such as mentioned above. (See Journal of the Institution of Electrical Engineers, 1894.)."

That a body moving uniformly in a circle is acted upon by a force, tending to drive it from the centre, called a ' centrifugal ' force

A long correspondence on this subject took place in *The Engineer* towards the end of 1909, and the leader in *The Contractor* of Jan. 1, 1910, dealt with it and other misconceptions.

Newton's First Law of Motion is that a body will continue in its state of rest, or of uniform motion in a straight line, unless compelled by an applied force to alter that state. Imagine a body moving in a straight line on a horizontal, frictionless plane and that the resistance of the air (as usual) be neglected. Imagine that there is a small eyelet attached to one side of the body, and also that there is a weightless, frictionless, inextensible string having one of its ends fixed to a point in the plane, while a hook is attached to its other end. Pull the string straight, and let the straight-line path of the body pass through the hook-end of the string and be at right angles to it. Then at the moment the body is passing the hook, drop the latter into the eyelet. What will happen ? The body was obviously attempting, like all-well-behaved bodies, to obey the Law and " keep the noiseless tenor of " its way ! But the string is already straight, and as the body attempts to move *straight forwards*, the string pulls the body. One end of the string being fixed to a point (the centre), the pull is towards this point and at right angles to the straight-line motion of the body. The body is thus *pulled by* the string, but this pulling, being at right angles to the motion of the body, does *not* alter its linear speed, though it is continuously altering its *direction* of motion, making it in fact describe a circular path. Now, remembering that when the body was moving uniformly in its straight-line path (before the hook was attached) there was *no* force acting on it,* we

* Of course, a force had to act on it for a short time in the first instance to give it the uniform motion, but our experiment does not begin until this has been done.

see that the *only force* acting on it after the hook was attached is the *pull of the string* TOWARDS THE CENTRE. This is called a *centripetal* force, and there is no force acting on the body tending to make it *fly from the centre*, as a 'centrifugal' force would tend to make it do. The pull of the string is also called the accelerative force, *i.e.*, the force causing the acceleration, which in this case is at right angles to the motion. Obviously, the string being the only thing acting on the body, the pull it exerts must be the only force acting on the body, and the direction of this force must be in the line of the string. Moreover, it must be a tensile force, as the flexible string cannot push the body!

As a further illustration we may observe the particles of mud or water leaving the rim of a rotating wheel, and should find that they do so *tangentially* and not radially.

If, finally, we consider the equilibrium of the point (the centre) to which one end of the string was attached we see that the string pulls it in the *opposite* direction to that in which it pulls the body, *i.e.*, it tends to pull the point *away from* the centre. This pull of the string on the point is a centrifugal force.

That a body moving with uniform speed in a circle is not subject to any acceleration

In order to save repetition the reader is requested to read the preceding paragraph on 'centrifugal' force.

Then we must be quite clear as to the meaning of 'acceleration.' It is defined as 'rate of change of *velocity*.' We must further be quite clear as to the meaning of 'velocity,' for it is not the same thing as 'speed.' 'Speed' is 'rate of change of position' without regard to the *direction* of motion, but 'velocity' includes the *direction* of motion as well as the speed of the body. Hence 'velocity' includes two factors, 'speed' and 'direction,' and if we change *either* of these we change the velocity, and 'rate of change of *velocity*' is acceleration. The most familiar example of rectilinear acceleration is that of a body falling freely. In this case the direction of motion is straight towards the mass-centre of the earth, but the speed is continually increasing, the rate of increase being approximately 32 ft. per second every second. Now, in the preceding article we saw that the *speed* of the body when rotating in the circle was uniform, but the *direction* of motion was being continuously changed, hence the *velocity* was being changed.

The *rate* of change of the velocity is the acceleration, and hence the body rotating uniformly in a circle is subject to acceleration.

Consider the case of a body attached to a string and rotating uniformly in a circle on a smooth horizontal plane. The acceleration of the body is caused by the centripetal force applied to it by the string.

In the case of a body subject to acceleration in a straight line, the acceleration is usually expressed in feet per second per second. That means the velocity is increased each second by the same number of feet per second. When we obtain the expression for the acceleration of a body moving uniformly in a circle, we find it is $\frac{v^2}{r}$, where v is the speed in feet per second and r is the radius in feet of the circle, and the dimensions of this expression are also feet per second per second.

There is a tendency to want to call this latter acceleration (when found !) by another name, but as its units are the same as those of the more usual acceleration, there is no need for this, especially as there is very little chance of confusion when the subject is once understood.

Of course, a body which is moving in a circle may also have its *speed* increased. That is its *angular* velocity is increased and therefore it is subject to *angular* acceleration which is measured in radians per second per second.

That in order for a body to be accelerated, it must have work done upon it

The reader is requested to study the two preceding articles before reading what follows.

In order for ' work ' to be performed, a force must overcome a resistance and cause motion *in the direction* of the applied force. Now, in the case of a body rotating uniformly in a circle, we have seen that the only force acting on the body is the centripetal force (the pull of the string), which is *at right angles to the motion.* [The pull is radial ; the motion tangential.] Hence no work is done upon the body.

Another way of considering the problem is this : When the body is rotating uniformly in a circle it possesses a certain amount of kinetic energy due to its motion. If now the centripetal force did work upon the body, its energy would be increased, and would go on increasing. Thus we should

have perpetual motion and an inexhaustible source of energy, " which is absurd," as Euclid used to say !

That oxidation of matter in water goes on only at the surface in contact with air

" Referring to the article on ' An Effluent Paradox,' published in our issue of the 17th ult., Dr. Edward Divers, F.R.S., F.I.C., who noticed a copy of the *Journal* containing it, writes us in terms that from so eminent a chemist and physicist are more than pleasing. He says, ' The paradox and rest of argument rest on the " fallacy " so common, that oxidation of matters in water goes on only at the surface in contact with air. No one not experienced realises the magical quickness with which aërial oxygen penetrates all parts of a mass of water. It is easy nearly to deaërate water in the laboratory, but very hard to keep it deaërated with even momentary contact with air. It is similarly easy nearly to dehydrate alcohol or ether, but very hard to keep either dehydrated with even only momentary exposure to air. Great mistakes in research have consequently been made through not realising this by learned chemists. The value of the estimation of oxygen or water for sanitary purposes rests upon the dependence of its amount, not on its getting into the water, but on its remaining in the water unconsumed. Dilution of water fouled with oxidisable impurities, with pure water, favours destruction of the impurities by burning them in contact with a larger amount of dissolved oxygen. The history of the sanitary purification of drinking water gives an excellent example of the fact that in the application of science in the arts, practical experience is necessary before anything can be done in applying science with effect.' "—*The Contract Journal*, Dec. 29, 1909, p. 1453.

That it is impossible to balance an egg on one of its ends

" It is really impossible to make an egg stand on its end ; so Columbus crushed in the impossible basis, and made it stand, though with some damage to the refractory shell."—The *Times*, March 16, 1866.

Mr. C. E. Clark says it was not Columbus who first did this, but Filippo Brunelleschi, the Italian architect (1379-1446), who performed the feat in 1420 in order to silence the critics who asked him how he was going to support the famous dome

of the cathedral in Florence (Santa Maria del Fiore), which was begun about 1417.

C. C. Bombaugh, A.M., M.D., p. 179, *Facts and Fancies for the Curious*, confirms this.

It certainly is possible to so balance an egg, for we have done it on an ordinary white tablecloth placed over an oak table. There is no trick about it; it requires merely a steady hand and some patience. It is easier with a boiled egg than a raw one, though we have succeeded with both.

The following is perhaps a more useful fact connected with eggs :—

" There was one thing which I think Prof. Gray did not mention, and which I remember seeing Kelvin perform at least three times, to test the difference between a boiled egg and an unboiled one, by which one can ascertain at once whether an egg is liquid or solid inside. It was this : Place an egg on a smooth table, and, holding it between the hands, give it a spin on its side. Then stop it for a moment by laying one finger on it. Then lift the finger off ; if it is a solid egg, hard boiled, it remains stationary. If it is a liquid egg, the moment one takes one's finger off, the egg begins gently to rotate again because the liquid has not ceased running round inside. He was exceedingly fond of this kind of curious experiment, as who would not be if his mind were trained to take a delight in geometrical and dynamical problems."—Prof. Silvanus P. Thompson, D.Sc., F.R.S., *Journal of the Institution of Electrical Engineers*, 1915, Vol. LIII., p. 306.

That a Knot is merely a measure of length

The following correspondence took place in the *Daily Mail*, August 18, 1909, under the heading " What is a Knot ? " :—

" Sir,—When will the average Englishman understand what is meant by a ' knot ' in reference to a ship's speed ?

" One knot is a speed of one nautical mile per hour, and not a distance, as many people imagine. We see in some of the papers that the *Mauretania* eclipsed all records by steaming 618 knots during the day. This means that this ship steamed 618 sea-miles per hour during the day—a truly wonderful performance !

" One is right in saying that a ship steamed at thirty knots, which means to say that she went at thirty sea-miles per hour. But if we say she steamed at thirty knots an hour we are saying that she went at thirty sea-miles an hour an hour,

which conveys nothing. One knot is 6,080 ft. per hour, while one land-mile per hour is 5,280 ft. per hour. A ship steaming at thirty-one knots is going at, roughly, thirty-six land-miles per hour.

"Gatton, Reigate. P. N. R."

"Aug. 27 :—

"SIR,—Before the days of patent logs the speed of a vessel was taken by means of the 'chip,' or triangular log and a sand glass. This log consisted of a triangular piece of wood attached in a certain manner to a line. The log was dropped overboard, a certain length of line was allowed to run out, the log itself remaining stationary in the water until it was well clear of the ship. In the line a number of knots were tied at definite points and the line was allowed to run out through the hands of the person operating it.

"When the first knot was reached the operator gave the word, and another one turned the sand glass; the line continued to run out, and the operator counted the number of knots in the line which passed through his hand during the time the sand was running. The sand glass might be a minute or half-minute glass, which is immaterial, but in the result the person who was checking the speed of the ship by the log line would report so many 'knots.'

"This, to the master or navigator, would imply that so many knots as marked on the log line had run out during the time represented by the glass, and a simple calculation would convert this from 'knots per sand glass' to 'nautical miles her hour.' Hence it will be seen that the term 'knot,' as originally applied, was essentially a speed term and not one of distance.

"REGLD. G. L. MARKHAM
"(Late Engineer-Lieutenant, R.N.),
"143, Strand, W. C."

We need scarcely add anything except to point out that if 'knot' were a synonym for 'nautical mile,' then one or other of these terms would probably never have been coined, but when we see that 'knot' means a *speed* of 'a nautical mile per hour,' then the reason for the two terms is apparent.

At p. 25 of *Lessons in Applied Mechanics*, by J. H. Cotterill, F.R.S., and J. H. Slade, R.N., we read, "The expression 'nautical mile per hour' is never used in practice, but is abbreviated to KNOT. It is common to find 'knot' used as if it represented 'nautical mile,' so we have speeds given as

14, 15, etc., ' knots per hour.' This is erroneous, and should be guarded against, not that in the present case any grave error is caused, but because the student, by never using a term in any other than its strict meaning, will save himself from falling into numerous difficulties."

On writing to the Secretary of the Admiralty, I had the following reply :—

" Admiralty, July 17, 1914.

" Sir,—With reference to your communication of the 8th instant, requesting a definition of the term knot, I am commanded by my Lords Commissioners of the Admiralty to inform you that a knot is a speed of one nautical mile per hour, and that the British Admiralty knot is a speed of 6,080 feet per hour.—I am, Sir, your obedient servant,

" W. F. Nicholson

" (For Secretary)."

Prof. J. H. Cotterill, F.R.S., of the Royal Naval College, Greenwich, and *The Concise Oxford Dictionary* also define a knot as a *speed*.

That when flying round a long aerodrome, with the wind blowing parallel to the length, an airman saves as much time when flying with the wind as he loses when flying against it

A simple illustration will show this idea to be wrong. In order to get round numbers let us suppose the aerodrome is 25 miles long, that the airman can fly at the rate of 50 miles per hour in still air, and that a wind of 25 miles per hour is blowing along the aerodrome. Then if no wind were blowing it would take the airman $\frac{2 \times 25}{50} = 1$ hour to complete one circuit. When the wind blows and he is flying with it his speed over the course is $50 + 25 = 75$ miles per hour, and therefore he does the first half of the course in $\frac{25}{75} = \frac{1}{3}$ hour $= 20$ minutes. During the second half of the course he has the wind against him, consequently his speed is then $50 - 25 = 25$ miles per hour, and it takes him $\frac{25}{25} = 1$ hour to do the second half of the journey. Thus when the wind is blowing the complete circuit occupies 1 hour 20 mins., while when there is no wind it takes only one hour. Or he saves $30 - 20 = 10$ mins.

when flying with the wind, and loses 60 – 30 = 30 mins. when flying against it. Thus there is a net loss of 20 mins. due to the wind.

That in thermodynamics the theory of the 'Carnot Cycle' is due to the late President Carnot of France

President Carnot was not an engineer and had nothing to do with thermodynamics, though his grandfather, Lazare Nicolas Marguerite Carnot, was celebrated as a scientist as well as a statesman.

The Carnot cycle is due to Nicholas Léonard Sadi Carnot *b.* 1796, *d.* 1832, a noted French Physicist, his best known work being *Réflexions sur la puissance motrice du feu et les machines propres à dévelloper cette puissance* (1824).

President Carnot also had the Christian name 'Sadi.' Possibly this is the reason for the usual mistake.

That gold paint, or mosaic gold, is made of gold

There is no gold in either of the above. "All that glitters is not gold," and in this case the glittering is due to stannic sulphide, a golden yellow crystalline compound of one atom of tin combined with two atoms of sulphur. It is obtained by heating tin amalgam, sulphur and ammonium chloride in a retort.

That a person can be Killed by the wind of a cannon-ball

> *"When many times the captive Grecian falls,*
> *Even in the fan and wind of your fair sword,*
> *You bid them rise and live."*
>
> Troilus and Cressida, V., iii., 41.

This is one of the fallacies dealt with by J. B. Harrison, Surgeon, in *Chambers's Edinburgh Journal*, 1850, p. 364. Mr. C. E. Clark also refutes it at p. 152 of *The Mistakes We Make.*

The eminent Army Surgeon, Mr. Samuel Cooper, says in his *Elements of Surgery*, p. 175 :—

"A cannon-ball, especially when nearly spent, frequently strikes the surface of the body or limb obliquely, and is reflected without breaking the skin. A soldier may be killed in this way without any appearance of any external violence. His comrades suppose, therefore, that he has been killed by the *wind of a ball!* But the error of this opinion is immediately

manifest when it is remembered that cannon-balls often carry away parts of the dress without doing any harm to the person."

Mr. Druitt, the author of a once valuable little manual of surgery, accounts for these so-called wind-contusions in a similar manner, and quotes the celebrated Baron Larrey in support of his views.

It is in the City that we hear of things being 'killed' by too much 'wind'!

On April 15, 1914, the *Daily Mail* had an account of a 95-second boxing match between the French champion Georges Carpentier and Mr. George Mitchell, in which the following paragraph appeared :—

"Carpentier has rarely looked better than when he smilingly stepped into the little ring at the Salle Lerda, and so great was the force of his blows that the tall, wiry Yorkshireman was swept off his feet even when the Frenchman's blows did not land!!"

In the same paper on Mar. 23, 1915, there was an article by F. H. Gailor, an American Rhodes Scholar of New College, Oxford, in which he wrote :—

"One 21cm. shell had cut a swathe about 100 yards long out of the woods on the hill where we dismounted. The trees were twisted from their stumps as if a small cyclone had passed, and one could realise the damage the shells could do merely by the displaced air."

While in the issue of Aug. 26, 1915, there was an article on 'Shell Shock' by a physician in which it was stated that :—

"Soldiers always believed that a cannon ball passing close to the person might cause internal injury without leaving any mark on the skin.

"This was called 'winding,' an occurrence about which surgeons have been very sceptical. They explained the injury on the theory that a heavy mass of iron striking the body might produce no external mark and yet work serious mischief inside the body. Whatever may be the truth about 'winding,' there is no room for question, now that the great pressure of air resulting from the explosion of a large shell may completely incapacitate a man, perhaps for many months, without producing the slightest trace of a bruise or scratch or causing any discoverable injury to internal organs.

"There have been thousands of such cases in this war of high-explosive shells, and they constitute a puzzling problem for the medical man to explain or to cure."

The following important statement puts another light on the matter. It appeared in *The Royal Gazette* of Newfoundland, March 28, 1916 :—

"How Shells Kill Without Wounds.—High-explosive shells have a smaller radius of action than shrapnel, but they are more deadly, as the latter kill only by the balls or fragments that hit the body, while the intense concussion of the former may in itself be fatal, leaving no mark of a wound. An unusual observation has given R. Arnoux the basis of a novel theory that has been brought before the French Society of Civil Engineers. A pocket aneroid barometer that had been damaged in a room where a German high explosive shell had burst gave indications of the intensity of the effects, and showed that within ten feet the explosion must have produced a sudden barometric depression equal to about one-half the total pressure of the atmosphere. Men behind any kind of shelter might come within the influence of this sudden depression. It is concluded that the air and carbonic acid in solution in the blood are suddenly disengaged as minute bubbles, and that pressure from the heart may cause these bubbles to clog small arteries, stopping circulation—with the fatal results observed—until normal conditions under ordinary air pressure are restored."

The important difference in the explanation here is that it is the half *vacuum* which is produced that is the danger. That this partial vacuum is produced is in accordance with the author's many observations on the sites of explosions, which are recorded in connection with the fallacy that when an external explosion occurs the windows are blown *in*.

Readers will distinguish between the wind of a solid cannon-ball and the violent disturbance due to the explosion of a high explosive shell.

That warm water freezes sooner than cold

Even the illustrious Sir Francis Bacon fell into this mistake. See his *Novum Organum*, p. 307 (Pickering, 1850).

On asking a well-read man, who believed the above statement to be true, to explain why the warm water should freeze first he said, because the difference in temperature between the warm water and the air was the greater, hence the rate of loss of heat would be greater and hence the warm water would freeze sooner than the cold !

In Yorkshire, and possibly other places, when boys want to make a slide, they get a kettle of *boiling* water and pour it on the ground! The hot water is sometimes poured on the surface of snow which has first been trodden down. There is reason in this apparent madness, as the surface of the snow is thereby melted and forms a smooth level surface which afterwards freezes. But at other times the boiling water is poured on to a flag-stone pavement with no snow on it. This is genuine madness!

Now for the results of a couple of experiments. At 10.15 p.m. on Dec. 20, 1909, two saucers of water were placed on an outside window-sill. One of these contained water at a temperature of 105°F., and the other water at 60°F. At 11.50 p.m. the latter was partly frozen while the other showed no signs of freezing, and it was not till 0.03 a.m. that the latter began to freeze. At 0.18 a.m. that which had been originally 60°F. was still more frozen than the other.

The second experiment was made on Jan. 22, 1910. In this case the water was contained in three exactly similar and full half-pint tins, screened from one another to prevent heat transference by radiation. The first tin contained water which had been boiled and allowed to cool. The second contained fresh cold water, and the third contained hot water which had just been boiled. The results were as follows:

Time.	Temperatures.			Remarks.
	No. 1. Boiled and cooled.	No. 2. Cold fresh.	No. 3. Boiled and hot.	
p.m.	°F.	°F.	°F.	
9.0	67	67	180	
9.45	45	47	76	
10.15	39	41·5	57	
10.45	37	38	45	
11.15	35	35·5	40	
a.m.				
0.20	32 (*a*)	33	35	(*a*) Ice *just* forming on the thermometer.
0.45	33·5 (*c*)	33 (*b*)	34	(*b*) Ice just forming. (*c*) Decidedly more ice than in the case of (*b*), for it is forming round the sides of the tin at the top.

The warm water had not frozen when the experiment ended. Hence we see that water which has been boiled and then allowed to cool to the same temperature as cold fresh water freezes before the latter, probably because the boiling drives off the carbonic acid gas and air, and deposits any calcium carbonate previously in solution.

The rise of temperature of the unfrozen water in No. 1 at 0.45 a.m. is interesting. When water freezes the latent heat of the resulting ice is rendered sensible, and slightly warms the water surrounding the ice.

That pewter is the same metal as lead

Lead is a metal and an element ; pewter is an alloy of two metallic elements, viz., four parts by weight of tin with one of lead. Its tenacity and fusibility are greater than those of tin or lead. " Britannia metal," which is similar to pewter, is an alloy consisting chiefly of tin and a small proportion of antimony or copper, or both.

That ' density ' and ' specific gravity ' are synonyms

The specific gravity of a substance is the ratio of the weight of a piece of that substance to the weight of an equal volume of distilled water. Thus the specific gravity of copper is 8·94. This means that a cubic centimetre of copper weighs nearly nine times as much as a cubic centimetre of water.

The density of a substance is its mass per unit volume. One cubic centimetre of copper weighs 8·94 grammes, hence the density of copper is said to be 8·94 grammes per cubic centimetre. In the metric system the *numbers* expressing the specific gravity and the density are very conveniently the same, or are related by a power of 10 ; but this is not so in the British ' system.' For example, the weight of a cubic foot of water of 62·5 lb., and as the specific gravity of copper is 8·94, therefore the weight of a cubic foot of copper is $8{\cdot}94 \times 62{\cdot}5 = 558{\cdot}75$ lb., *i.e.*, the density of copper is nearly 559 lb. per cubic foot. Thus we see ' specific gravity ' is a ratio, and therefore a mere number, while ' density ' is a concrete quantity.

That the needle of a Compass points to the North Pole

The compass needle points to the North *Magnetic* pole, which is some 1,500 miles to the West of true North. The

North Magnetic Pole was located by Sir John Ross in 1831, and the South Magnetic Pole was located by Sir Ernest Shackleton in 1909.

In London a compass needle now points about 14° West of true North, and in some parts of the World the declination (as the angle to the East or West of true North is called) is as much as 50° ! The declination is not constant, but varies very slowly ; thus in 1570 the declination at London was 11° *East* of true North. It 1660 it was zero ; that is, the compass needle did then point to true North ! In 1800 the declination was 24° West of true North, and it has now (1923) decreased to about 13¾° West.

That Diamonds sparkle in the Dark

This fallacy is closely allied to that of a cat seeing in the dark. In the absence of all light (which is the definition of 'dark') a cat cannot see and a diamond cannot sparkle, but if in a comparatively dark place a beam of light be allowed to fall on a cut diamond, then the sparkling appears to be particularly effective on account of the dark background, which well shows off this property of the diamond.

A diamond, especially a coloured one, has, however, phosphorescent properties. That is, if one be exposed to bright sunlight or other intense illumination for some time, and then be taken into a dark place it will emit a small quantity of light for a short time.

That the phosphorescence sometimes seen on dead fish is due to phosphorus in which the flesh of fish is supposed to be rich

This phosphorescence is more often seen when the fish is not quite fresh, though it need by no means be bad. It is a phenomenon well worth seeing, and is very similar in appearance to the phosphorescence seen at sea. Both are due to bacteria. F. Alexander McDermott has worked at the subject, following the lead of Prof. Molisch, who determined that of all the light-producing bacteria *Pseudomonas lucifera* was the most efficient.

That at any one time it is possible to see many thousands of stars with the naked eye

"*The skies are painted with unnumbered sparks.*"—
Julius Cæsar, III., i., 63.

The total number of stars visible to the naked eye, even if the observer go to different parts of the Earth at different seasons of the year, is only a matter of some 6,000, but as only about half the sky is theoretically visible at any one time, and as the stars near the horizon are invisible, owing to the greater thickness and murkiness of the atmosphere between them and the eye of the observer, the maximum number of stars which are visible to the naked eye at any one time is only about 2,000.

Mr. F. A. Bellamy, first assistant at the Univ. Observatory, Oxford, dealt with this fallacy when lecturing at Burlington Gardens, London, on Dec. 12, 1910, and Mr. J. Ellard Gore, F.R.A.S., gives some information on the subject in his *Astronomical Curiosities* (1909), p. 135 *et seq.*

Dr. Dionysius Lardner, in the chapter on Popular Fallacies (p. 88) in his *Popular Physics*, wrote, " One of the most curious and most incomprehensible illusions of the senses is the singularly erroneous estimate which we make of the number of objects of any kind that are presented to us. A striking example of this is presented by the impression made upon the eye by the view of the firmament on a clear starlight night. The number of visible stars is always immensely over-estimated. . . ."

By the use of a 60-inch telescope, combined with a camera, and exposures of several hours, the number of stars recorded is nearly 55 millions! And it has been deduced that the total number of stars in existence is 1,500 millions!!

That in the case of a wheel which is out of balance and rotating on a flexible shaft, the counter-weight to produce balance should be placed diametrically opposite the chalk-mark made on the rim by carefully moving a piece of chalk up to the rotating wheel

The flexibility of the shaft is the crux of the problem. Counter-weights in the case of wheels rotating on short rigid shafts held in rigid bearings *are* placed diametrically opposite the weights they are to balance; but the case of a flexible shaft, such as is used in de Laval steam turbines, is different. Draw a circle of radius a and centre O. Let C be a point on the circumference. Join CO and produce to m also on the circumference. Let m represent a small mass. On Om let O' be at a small distance r from O, and let the distance

$O'm$ be called R. Then suppose the diagram to represent a uniform disc of mass M having its centre at O, then on rotating the disc it will run true about O. Now attach a mass m to the disc and again rotate it on a flexible shaft. The disc is now obviously out of balance about O, and will consequently self-centre itself and rotate about O', where the distances R and r are such that $Mr=mR$. [The weight and elasticity of the shaft would also affect the problem, but they are left out of account for simplicity.] When thus rotating about O', let a piece of chalk be held firmly and in the plane of rotation so that it just marks the rim. It will do so at C, because the distance $(a + r)$ is greater than R. By now it should be clear that to add more weight at m (*i.e.*, diametrically opposite to the chalk-mark) would only aggravate the want of balance about O, and that the correct place for the counter-weight is at C, where the chalk mark is. The mass of the counter-weight would have to be equal to m and then balance would be restored about O. Even the position C is not strictly correct on account of effects which, for simplicity, have not been taken into account. The practical method is to rotate the wheel first in one direction and then in the other, making a chalk-mark in connection with each direction of rotation. Then the proper position for the counter-weight is midway between the two marks, measured along the shorter of the two arcs separating them.

That black glass is really black

It is proverbial that things are not always as they seem ! This is a case in point. Some glass, when thick, certainly looks black if not carefully examined, but if a small piece be flaked off so as to leave a very thin edge, or if a piece be heated in a blow-pipe flame and drawn out into a fine thread, then its true colour will be seen. This may be one of several colours, *e.g.*, green, purple, blue or brown.

That the hydrostatic pressure of water depends on the size of the pipe containing it, as well as on the vertical height of the water

This fallacy possibly arises through the mind dwelling on the conception of the total weight of water in the pipe, which in fact has no effect as regards the intensity of pressure.

When testing cast-iron drains under a head of 20 feet of water the author sometimes makes use of one of the soil-pipes to obtain the head, but the contractor occasionally objects to this method on the plea that the drains then have to support the weight of all the water in the 4-in. soil-pipe, and claims that the fair and proper test is to use only a half-inch pipe for the head !

Another amusing instance, for which I am indebted to my old friend Mr. Ernest Benedict, M.I.C.E., is that of a circular water tank on a single column, such as may be seen at some railway stations for feeding the locomotives. In constructing this it was proposed to connect the supply pipe to the bottom of the tank, but this proposal was objected to " because the supply pipe would then have to withstand the weight of all the water in the tank," and it was asserted that the proper way was to carry the supply pipe up the side of the tank, with a bend at the top so as to make the pipe discharge into the top of the tank !

It is easy to obtain a hydrostatic pressure of, say, 25 lb. per sq. in. by means of only 6 lb. of water, while by reducing the vertical head it would be equally easy to use, say, 600 lb. of water and obtain a pressure of only 2·5 lb. per sq. in. Perhaps an example will make the matter clear. Imagine, for simplicity, a *square* vertical pipe having its sides each one foot long. Suppose it is 50 ft. high, closed at the bottom end and filled with water. The total quantity of water in the pipe will be $50 \times 1 = 50$ cu. ft., and the weight of 1 cu. ft. of water being 62·4 lb., the total weight of water in the pipe will be $50 \times 62{\cdot}4 = 3{,}120$ lb. The whole of this weight rests on the bottom end, which being a square foot we say the intensity of pressure is 3,120 lb. per sq. ft. This intensity of pressure is of course uniformily distributed over the whole square foot forming the end. Now imagine very thin steel partitions at right angles, running from top to bottom of the pipe, and so placed as to divide the cross-section of the pipe into four equal parts. There would then be practically four square pipes each having sides 6 ins. long. The total weight of water in each of these would be $\frac{1}{4}$ of 3,120 lb. = 780 lb., and this would be supported by the bottom end of each of the four pipes. The area of each of these would be $\frac{1}{4}$ sq. ft., and the intensity of pressure would be $780 \div \frac{1}{4} = 3{,}120$ lb. per sq. ft. as before. In fact, of course, the placing of the partitions has not had any effect on the intensity of pressure,

and the subdivision might go on indefinitely, were it not for the fact that when the pipes became very small, the effect of capillary action would come in, and the ordinary rules with regard to hydrostatic pressure would no longer apply.

A variant of this fallacy is that a greater pressure in the water mains of a town may be obtained by enlarging the reservoir to which they are connected!

That the yield of a Reservoir is proportional to its storage capacity

The principal advantage of a storage reservoir is what may be called its 'fly-wheel action.' A fly-wheel is used to store energy during the small portions of a revolution when the piston effort is greater than the work being done by the engine, and to return this energy to the crank-shaft when the piston effort is less than the work being done by the engine. So with a reservoir, it is to store water when Nature gives us more than meets our immediate requirements, which store we draw upon when there is little or no rainfall, or the springs and streams are very low. The fly-wheel does not make energy, nor does the reservoir manufacture water. The fly-wheel when rotating at a given speed has a definite amount of energy stored in it, and the reservoir for a given level of the water in it has a certain quantity of water in it. It is no use making the capacity of the reservoir greater than a certain amount, depending on the available quantity of the supply water, and the quantity of water required for domestic or other use. This will be made clear by taking exaggerated cases. Suppose the total quantity of available supply water during the wet season preceding the dry one were only 10,000 gallons, then a reservoir of 100,000 gallons capacity would obviously be too large. Again, suppose during the whole dry season only 10,000 gallons of water were required, then equally obviously a reservoir of 100,000 gallons capacity would be too large. The maximum size, where every drop of water that can be conserved can be utilised, is such that with the heaviest and longest rainy season it is never necessary to let any of the water run to waste. Increasing the capacity beyond this would not render more water available for use, for the average annual yield of such a reservoir is exactly equal (except for losses by leakage and evaporation) to the average total quantity of available supply water.

That the hardening of ductile metals by cold working is due to the hammering closing up the spaces between the molecules, while heat opens up these spaces

Sir George Beilby, F.R.S., lectured to the Institute of Metals, on May 12, 1911, his subject being, "The Hard and Soft States of Metals." He said that: "That hardening effect of cold working on ductile metals and the softening effect of reheating must have been known to the earliest workers in metals. To the inquiring mind the phenomena were sufficiently explained as being due to the 'compacting' effect of hammering and the 'opening up' effect of heat. The advent of more scientific methods of inquiry led to the *exposure of the fallacy*, and to the discovery of new points of difference in a metal in the two states. The discovery that the polishing of all substances, even of those so hard or brittle as antimony or calcspar, involves the transient liquefaction of a thin layer on the surface led to the study of this subject from an entirely new point of view. In a pure ductile metal which has been slowly cooled from the molten state the structure of the solid is completely crystalline, and the metal is in its softest condition. Any permanent deformation of the mass, whether by hammering, by rolling, or by wire-drawing, hardens and stiffens it. The microscopic examination of the hardened metal shows that its original crystalline structure has been broken up and replaced by a new type of structure. If the hardened metal is raised to a sufficient temperature the softness is completely restored and the crystalline structure is also restored. In the ductile metals the greatest degree of softness is always associated with well-developed crystallisation. The fundamental difference in structure in the two states was illustrated by Dr. Beilby by a series of photomicrographs.

"The composite character of the hardened structure, which in some cases resembles a bed of broken and distorted strata concreted or cemented together by a matrix, can only be explained by the presence of two constituents, namely, the broken-down remains of crystals and an amorphous or glass-like form of the metal by which the mass is so firmly cemented together that it has become vastly more rigid and mechanically stable than the crystalline structure. This amorphous or vitreous form of the metal stands in the same relation to the crystalline form as glass does to the crystalline

silicates of which it is composed, or as the clear, vitreous ' barley sugar ' does to the ordinary crystals of the breakfast table."

That if a given weight of air be compressed to a high pressure and then be allowed to cool down to its original temperature, it possesses more energy than it had before being compressed

The so-called practical engineer would have considerable trouble in bringing himself to see that this is a fallacy ; in fact it is quite likely he would deny that it is a fallacy !

Two conditions are usually considered in connection with the compression of a gas. Either the temperature of the gas is supposed to be kept constant, which means that heat has to be abstracted during compression ; or, in the second case, no heat is supposed to be lost. The former is called isothermal compression, and the latter adiabatic compression. In the working of an ordinary air-compressor neither of these conditions holds good, but compression takes place under a combination of the two sets of conditions.

Isothermal compression takes place in accordance with the equation—

$$W = c\,T \log_e r$$

where, W = work done in ft.-pounds.
c = constant = 53·2.
T = the absolute temperature in ° F. of the air which is being compressed.
r = the ratio of the initial to the final volume of the air.

Adiabatic compression of air takes place in accordance with the equation—

$$P\,V^{1\cdot41} = c\,T = \text{constant}.$$

where, P = the pressure of the air in pounds per square foot.
V = the corresponding volume of the air in cubic feet

and c and T are the same as before.

For simplicity in our case we will suppose the compression to take place isothermally. This merely means that instead of allowing the temperature of the air to rise and then cooling the air down to its initial temperature, we will suppose that sufficient heat is abstracted during the compression to prevent the temperature rising. Then it can be shown that

the heat abstracted is exactly equal to the work done in compressing the air, and either quantity is equal to $c\ T \log_e r$. Hence as the amount of work put in is equal to the amount of heat taken out [heat and work being interchangeable at the rate of 1 B.T.U. for every 778 ft.-pounds], obviously the total energy of the air cannot have been altered.

Take an example. Suppose we have 130 cu. ft. of air at say 60° F. and atmospheric pressure. This is about 10 lb. weight of air. Now compress it isothermally until its pressure is, say, 100 lb. per sq. inch. It is hard not to think that the total energy of the air is not more than it was before compression, for the mind instinctively thinks of a compressed spring, air being an elastic fluid. But the analogy is false, for very little heat is produced and lost in the compression of a spring, consequently the compressed spring has more energy than it had before compression, and it is able to expand without taking any heat from its surroundings; but this is *not* the case with our compressed air. It cannot expand unless it gets a supply of heat from somewhere, so if we give it an opportunity to expand, it abstracts heat first from itself (*i.e.*, its temperature falls) and as its temperature is then less than that of the surrounding objects, heat flows from the latter into the cooler gas, thus enabling it to expand and do some work, but this is at the expense of the heat robbed from its surroundings, and in the case we have stated in the heading we have assumed there is no fall of temperature, or supply of heat from anywhere.

It is well known that in working machinery by compressed air, heat must be supplied to the cylinder. In many cases no particular provision is made for this as heat is abstracted from the surrounding air owing to the temperature of the cylinder becoming very much less than that of the atmosphere. In some cases this leads to the exhaust valves becoming clogged with frozen moisture. In other cases the expansion of such a compressed gas is used for making ice or for freezing meat.

That the discharge of a Sewer is a maximum when the sewer is quite full

The discharge of a sewer is equal to the product of the mean velocity into the cross-sectional area of the fluid in the sewer, hence of course if the cross-sectional area could be increased without lessening the mean velocity, the discharge

would be a maximum when the sewer is full; but the mean velocity is affected by the surface friction, and this is a maximum when the sewer is full, so that though there is a gain in area, the loss in velocity is greater. Another way of thinking of it is to notice that the last small portion of the area at the top of the sewer bears a much smaller ratio to surface of the sewer forming its boundary than does the remaining cross-section bear to its boundary.

That if as much work could be got out of an engine as was put into it (*i.e.*, if its efficiency was 100 per cent.), then it would be a perpetual motion machine capable of doing useful work for an indefinite time

The error underlying this idea seems to be that if we could only do away with friction, then the question of perpetual motion would be successfully solved, but this is not so. If we could do away with friction at will (it would be highly inconvenient, to say the least of it, if *all* friction were done away with !), then we should be able to have plenty of machines having 100 per cent. efficiency, but we should still be almost as far from perpetual motion as ever. By this is not meant that we could not have a machine which would go on moving for ever. A frictionless machine would, if once started, go on for ever, and being frictionless, it would never wear out, but perpetual motion seekers are, of course, not trying to invent machines which will merely keep moving. They wish to devise machines which, without any supply of energy, will do useful work, and thousands of pounds sterling are wasted annually in the fruitless attempts even in this 20th century ! Hence a frictionless machine if once started would go on for ever, but it could do no useful work. If the attempt were made to give it work to do, it would just return the kinetic energy put into it at the start and then it would come to rest. Even so we are assuming the machine so frictionless that the air had no stopping effect on it !

That Cast-iron Drains Rust and Corrode Badly

They probably rust and corrode to about the same extent as gas and water mains of the same material. If anything, the effect is less in the case of drains than in the case of water mains, for the latter frequently rust rather badly on the inside, whereas drains do not rust inside, but only outside.

The reason for this is that drains get a greasy slime on their inside which prevents rust and corrosion. Quite a number of cast-iron drains have now been in use for 30 years, and they are practically as good as ever. All the best domestic sanitary work is now done in cast-iron so far as the underground drains are concerned. They are more durable, have fewer joints, and are stronger, than stoneware pipes, and the jointing can be done much more efficiently than in the case of stoneware pipes. The difference in cost is not so great when really first-class work is insisted upon in both cases.

That Air is the best non-conductor of heat

Dry air is certainly a very good heat insulator, especially if it be prevented from circulating so as not to cause a loss by connection, but it is not the best conductor—literally, *nothing* is the best conductor, which seems anomalous, until we explain that by nothing we mean the absence of everything! More briefly, a vacuum is the best non-conductor of heat, and this fact is made use of in the well-known "Thermos" flasks, the principle being first made use of for the preservation of liquid oxygen, and liquid air.

Some years ago powdered mica was used as a heat insulator, and some tests which seemed to be reliable showed it to be very effective. The explanation given was that the heat was reflected from the innumerable facets of the mica and was thus prevented from escaping. It also of course retained a good deal of practically motionless air.

That in the case of a dynamo, the electricity is generated by the friction of the brushes on the commutator

A confusion of facts seems to be responsible for this error. There are certain machines used in laboratories for generating high tension electricity, known as frictional machines, in which a silk pad rubs on a glass drum or circular glass plate. In an ordinary direct current dynamo the electricity is generated by the movement of a number of copper coils through a strong magnetic field. This is technically called 'cutting the lines of force' and the greater the rate at which this is done, the greater the electric pressure, and hence the greater the current. The commutator is part of the arrangement for collecting the current and keeping the 'flow' in

one direction. The friction of the collecting brushes on the commutator has nothing whatsoever to do with the generation of the electricity, and it would be much better if there were no friction in this case.

That electricity increases power, *e.g.*, if you have a small dynamo driving a large motor, then you get more power out of the motor than you put into the dynamo. Similarly if a large dynamo be driven by a small steam engine

There is no knowing by what psychological process this error has been attained, though there is not the slightest doubt about it being an error. As a matter of fact to drive a large motor by a small dynamo would be less efficient than if the dynamo were slightly larger than the motor. Similarly, if the steam engine were slightly more powerful than the dynamo, the combination would be a more efficient one than the one named in the heading.

That when any body of a given mass and moving with a given speed strikes a fixed body, the blow produced is of a definite magnitude, and is easily calculated from these data

Let the mass of the moving body be M 'slugs' [Note.—1 slug = 32 lb.] and its speed v feet per sec.; then its momentum is Mv slug-foot-seconds, and its kinetic energy is $\frac{1}{2}$ M v^2 ft.-pnds.

By experiment it has been found that—

(1) $F = Ma$ [Force = mass-acceleration], where F is a force in pounds and a is the acceleration in ft. per sec. per sec.

Multiplying both sides of this equation by t (time in seconds) we have—

(2) $Ft = M\,a\,t$

But $a\,t$ (acceleration $\times$ time) = v ft. per sec.

(3) therefore $Ft = Mv$ [Ft is called an impulse].

(4) hence $F = \frac{Mv}{t}$ *i.e.*, Force = rate of change of momentum.

This last equation is the one usually used when it is required to determine the pressure (force) produced on a plane by a jet of water impinging normally on it. By taking M as the mass of water reaching the plane per sec., and $t = 1$ sec. we get the pressure in pounds.

When it is a case of a solid body of mass M impinging with a velocity v on a rigid body, we usually proceed thus :—

$a\,t = v$, *i.e.*, the acceleration a acting for the time t produces a *final* speed v *at the end of the time* t ; hence the *average* speed during the time t is $\frac{v}{2}$ ft. sec.

Multiplying both sides of equation (3) by $\frac{v}{2}$ we have :—

(5) $\quad Ft\,\frac{v}{2} = Mv\,\frac{v}{2}$

(6) But $t\,\frac{v}{2} = d$, *i.e.*, time × average speed = distance (in feet).

(7) Therefore $Fd = \frac{1}{2}Mv^2$, *i.e.*, Work = Kinetic energy.

From this last equation we see that in order to determine F, the force of the blow, we must know not only the mass M of the moving body and its speed v, but we must also know the distance d throughout which the force F acts. Now suppose the case to be that of a motor-car running into a heavy masonry wall, how is the force of the blow to be measured ? Or suppose it is the case of a steel shell striking (without penetrating) a " Dreadnought " ? Obviously, we cannot readily determine d. Notice that it would do equally well if we could determine the duration, t, of the blow, for then $t \cdot \frac{v}{2} = d$. [Equation (5) above.] But in both the cases mentioned it would be as difficult to determine t as to determine d, and without either of these it is impossible to determine F, even when M and v are known. Hence the fallacy. Perhaps the following illustration, though not a rigid proof as the foregoing, will make the matter clearer. Suppose a blunt-nosed, hard steel shell, of mass M and moving with a speed v, to impinge on the steel armour-plating of a " Dreadnought." This would produce a definite (though unknown blow). Now instead of a hard steel shell, suppose the projectile to be of the *same* mass, the *same* cross-section, and to be moving with the *same* speed, but to be made of soft copper or even lead, then obviously the blow (though equally definite and unknown) would be *less* than that produced by the hard steel shell. The hard steel shell would come to rest much more quickly than the copper or lead one ; *i.e.*, the duration of the blow of the steel shell would be much

less than that of the softer shell, but the kinetic energy of the two shells is the same (so is the momentum), and as all of this has to be expended in either case, it means that when the time (or distance of crushing) is short the force is large, and vice versa, because, except for the loss of energy due to the heat generated by the blow, the product of the *average* force into the distance is equal to the kinetic energy of the shell just before impact. Similarly if the momentum be considered, for the rate of change of momentum (= force) in the shorter time (hard shell) is much greater than the rate of change in the longer time. Hence a blow does *not* depend solely on the mass and speed of a moving body, but also on the *material* of which it is made, for the material affects the duration (either as to distance or time) of the blow, and the shorter the duration the greater the blow for a given mass and speed.

It will be noticed that a "Dreadnought" has been used as an illustration of a practically immovable object. On explaining to a scientific friend that there was a difficulty in naming anything on land which gave a greater impression of an immovable object, he immediately suggested the Home Office!!

To determine the forces involved when a pile is driven is a very difficult and complex matter. In 1916, Henry Adams, M.I.C.E., read a paper before the Concrete Institute. He took 39 different pile driving formulæ devised by 39 different engineers and applied them to one set of data referring to a particular pile. The results varied from 37 tons to 333 tons for the 'ultimate load'! None of these formulæ takes the duration of the blow into account, because no instrument was then available for determining this quantity. The author designed and made an auto-graphic pile-set gauge in May, 1921, which records the duration of the blow on a pile; the elastic compression of the pile and ground; and the 'set' or distance which the pile is caused to penetrate the soil, and with these data a much more reliable estimate of the forces involved in pile-driving has been rendered possible. *Vide* A. N. Hiley's paper on the effect of the hammer-blow in pile-driving, and the author's papers on the physical properties of clay and the dynamics of pile-driving, all published in the *Trans. of the Soc. Engr.*, in Sept., 1923, June, 1922, and Mar., 1923, respectively.

That a blow or 'impulsive force' is essentially different from a compressive force

A blow or 'impulsive force' is usually described as a force which acts for a time too short to be measured conveniently. The late Prof. Bertram Hopkinson, of Cambridge, experimented with such forces, but of course there is no difference between them and any other compressive force. The reader is referred to the preceding fallacy for some more information on the subject. *Vide* p. 71, *Physics*, by W. Watson, D.Sc.

An illustration may help to make the matter clear. Suppose that on the same railway track there are two trains going in the same direction and, say, 100 yds. apart, and that the train behind is moving *very* slightly faster than the one ahead. Then in time the one behind will catch the other one up, the buffers will come together gently and the train behind will obviously *push* the other a little, and the speed of the double train will be slightly more than the original speed of the first train, and slightly less than the original speed of second train. Now repeat the experiment, but make the speed of the train behind a little greater. Result, it gives the train ahead a rather harder push. Repeat experiment with a still greater speed of the second train. The harder push becomes an unpleasantly large force, causing a very sudden acceleration of the first train. Then let the speed of the second train be greatly in excess of that ahead and the large force becomes a violent blow, while if the train ahead be considered to be at rest the blow becomes so great as to cause a railway disaster.

The intention of this illustration is to show that there is no difference in kind between a gentle push, *i.e.*, a compressive force, and a hard blow, though a hard blow may be unkind!

That Lightning Conductors do more harm then good because they attract electricity, and that if used they should be insulated from the building

Mr. Killingworth Hedges, M.I.C.E., is an authority on lightning conductors, and as an outcome of a paper he read in 1900, a Lightning Research Com. was formed of which Mr. Hedges was Hon. Sec. They issued their report in 1905 and in the same year Mr. Hedges published his *Modern Lightning Conductors*. There does not appear to be a word in this book, or in *Ency. Brit.* in support of the above statement.

On the contrary we find at p. 16 of the said book, "The rod is not to be kept from the building by glass or other insulators but attached to it by metal fastenings."

At p. 96 of *Heroes of Science, Physicists*, by William Garnett, M.A., D.C.L., ". . . . of late years a good deal of money has been wasted in providing insulators for lightning rods. A few years ago the Vicar and Churchwardens of a Lincolnshire Parish were strongly urged to go to the expense of insulating the conductor throughout the whole height of the very lofty tower and spire of their church. Happily they were wise enough to send the lightning-rod man about his business. But this is not the only case which has come under the writer's notice, showing that there is still a widespread impression that lightning-conductors should be carefully insulated."

An interesting article entitled *The New Teaching about Lightning Conductors*, by "Home Counties," appeared at pp. 166-173 of *The World's Work and Play*, July, 1906, but perhaps the most amusing little bit of information on the subject appears in the 11th ed. of *Ency. Brit.*, where we read, "A single air terminal is of no more use than an inscribed sign-board (! !) ; besides multiplying the number of points, numerous paths, as well as inter-connections between the conductors, must be arranged to lead the discharge to the earth. The system of pipes and gutters on a roof must be imitated. Soft iron, galvanised, is better than copper, and is, of course, cheaper."

The great Benjamin Franklin was the first to suggest the use of lightning conductors, and his instructions are, "The rod may be fastened to the wall, chimney, &c., with staples of iron. The lightning will not leave the rod (a good conductor) to pass into the wall (a bad conductor) through these staples. It would rather, if there were any in the wall, pass out into the rod, to get more readily by that conductor into the earth."

From a report to the Netherlands Academy of Science in 1905 we quote, "We no longer guarantee absolute security, but can only say that the protection afforded is more or less good according to whether the system adopted conforms with the principles which science has shown to be correct. The means by which protection is secured and the outlay required depend to a large degree on the value attached to the preservation of a building from damage great or little."

This fallacy was described as " a mischievous and baseless delusion " by the late Sir William H. Preece, F.R.S., in his presidential address to the Inst. of Civil Eng., Nov. 1, 1898.

Sir William Snow Harris stated in a Report he made to Parliament in 1855 :—

" It is proved by an extensive induction of facts and a large generalisation in the application of metallic conductors, that metallic substances have not exclusively in themselves any more attractive influence for the agency of lightning than other kinds of common matter . . . "

That Blue and Yellow make Green

On May 7, 1855, Clerk Maxwell wrote (*Vide* p. 284 of *Heroes of Science, Physicists*, by Dr. William Garnett) :—

" There were sundry men who thought that blue and yellow make green, so I had to undeceive them." He was referring to a meeting of the Cambridge Philosophical Society, so any reader who may be under the above misapprehension is in good company !

" It is important to distinguish between a mixture of *pigments*, and a mixture of *colours*. A mixture of blue and yellow pigments does produce a green pigment, but a mixture of blue and yellow light does not produce a green light. This may be tested in a very simple manner by means of a colour top. *E.g.*, if a slit disc with blue pigment on it (dry of course) be interlaced with a slit yellow one so that one quarter of the resulting disc is yellow and three-quarters are blue, and this be rotated rapidly, it will at once be seen that there is not the slightest appearance of green, but instead the rotating disc appears to be blue-grey. If more yellow be taken it appears to be fawn colour. It is possible so to mix blue and yellow light as to produce the sensation of white.

Suppose a mixture to be made of blue and yellow powders and that a strong white light fall on this. The blue particles will absorb all the coloured rays contained in the white light except the blue and green. The yellow particles will absorb the blue light, but will transmit the green. Hence all the colours composing white light will be absorbed by the mixed powders, except the green. Hence the mixed pigments appear green. It is important to remember that pigments are not monochromatic, though in looking at a vivid red poppy it is hard to believe this. If such a poppy be illuminated by blue light it appears to be black. A similar effect is very

noticeable when red coloured articles are illuminated by means of a mercury vapour lamp.

That the Primary Colours are Red, Yellow, and Blue

This mistake arose through colour experiments having been made by mixing *pigments* instead of mixing coloured *lights*, and the fact that pigment colours are not even approximately monochromatic.

The primary colours are red, violet, and green, each, of course, of a particular tone, and by mixing two or more of such coloured lights in suitable proportions we are able to make any colour sensation. A very beautiful example of this was exhibited in London under the name ' Kinoplastikon.' —*Vide* p. 171, *The Five Windows of the Soul*, by F. H. Aitkin.

That Quick-sand Sucks

Quick-sand is a mixture of sand and water. The sand is usually light in weight and small in size, or it would settle to the bottom, though sometimes this is prevented by the movement of the water. Clay and calcium carbonate are also usually found in quick-sands which, by the way, are by no means frequently met with. From this description it will be seen that the density of quick-sand is greater than that of water, consequently as far as this property of it is concerned it should support the bodies of man and other animals better than plain water. On the other hand it prevents quick movements, so that swimming is out of the question. The trouble is when people try to walk on it. The pressure per square inch of our feet on the ground is considerable and the quick-sand gives way under this pressure, letting us gradually sink in, then when we try to lift one leg out we *more than double* the pressure on the other, for while quick-sand does not ' suck,' owing to its consistency, it does not flow readily into a void, so that in trying to lift a leg a partial vacuum is formed round it. Clearly, this partial vacuum is due to our trying to lift our leg. *E.g.*, suppose a bridge to be over the quick-sand, and that a 6 in. $\times$ 6 in. timber be let down vertically into the sand for a distance of, say, 3 ft., and that its upper end be secured rigidly to the bridge. Then there is no tendency for the end in the sand to go farther in, or to pull out. Consequently there would be no partial vacuum around it ; on the contrary

there would be a pressure on the lower end tending to push the timber out. The whole problem is similar to the one in which a boy and a cat were concerned. The father of the boy said to him, "Georgie, don't pull the cat's tail." To which the young applied-mathematician replied truly, "I am not pulling the cat's tail. I am only holding it and the cat is doing the pulling." In like manner the quick-sand might say, "I am not sucking. I am only holding. The man is pulling and thus causing a partial vacuum which makes him think in his excitement that I am sucking."

If you should unfortunately get into a quick-sand, don't attempt to walk on it, but endeavour to lie down and roll over it. Should it be too soft to roll on, then keep on your back in a nearly horizontal position so as to leave your mouth clear of the sand. Try not to struggle, as to do so is very exhausting and increases the danger. The great thing to remember is that the quick-sand is much more dense than your body, and therefore your body cannot sink entirely into it. It is for you to see to it that the part left above the sand is your head.

That Rainbows are round because the Sun is round

A somewhat natural mistake to make when answering in a hurry and yet not logical, for 'round' in its first use means a circular arc, and in its second a circular disc, and if the reasoning were correct one would expect to see a disc of colour instead of a broad curved band of colour.

The complete explanation of a rainbow is a long matter and needs many diagrams, and as it has been done so admirably by Deschanel (*Elementary Treatise on Natural Philosophy*, Part IV., p. 1083) and by Prof. W. Watson in his splendid *Text-book of Physics*, p. 521, there is no need for us to give it here. Suffice it to say that as far as the curved nature of the bow is concerned it would be just as circular if the Sun were not 'round,' but were a mathematical point of light; that the Sun's rays as they reach the Earth are for all practical purposes parallel and that the primary rainbow (for a secondary and larger and fainter one is sometimes seen) forms the boundary of the base of a cone of which the axis is the continuation of the line joining the Sun and the eye of the observer. The angle at the apex of the cone of the primary bow is about 82° and that of the secondary bow is about 104°. Now the angle between any incident ray of the Sun causing the bow,

and the ray reflected by a spherical particle of water must be constant, and this can only be when the active raindrops form a circular arc. Of course, by this we do not mean that the raindrops arrange themselves in a circle and remain in that position. What happens is that the drops are continually changing and only those which are in the circular position satisfy the optical requirements of the case. The raindrops refract and reflect the Sun's rays.

That iron ships are attracted to the Cornish Coast by the action of the magnetic rocks there

The following two letters appeared in the *Daily Mail*, May 7 and 9, 1914, respectively :—

" Sir,—There is no truth whatever in the statement that ships are attracted to the Cornish coast by the magnetic influence of the rocks. In the course of my profession I have surveyed many miles of Cornwall, both on the coast and underground, and I have never found that even with a most delicate magnetic needle the deflection is over 2 deg. If such an instrument shows only this slight deflection there can be no possible attraction for ships at sea.

" A Cornish Mining Engineer.

" Camborne, Cornwall."

" Sir,—With reference to the correspondence on this subject, the late Mr. James Henderson, M.Inst.C.E., of Truro, in a paper read some years ago before the Federated Institution of Mining Engineers, stated as follows :—' It is a well known fact that in parts of the Botallack Mine the needle has been deflected to the extent of 50 or even 60 degrees from its proper direction."

" This would serve to show that there are rocks in this county of very strong magnetic power, and while they would not probably have any direct effect on an iron vessel in the vicinity, it is not at all certain they would not unduly deflect the compass with perhaps disastrous consequences.

" Truro. H. G. H."

Magnetic compasses when any appreciable distance from the said rocks do not point to them, whereas they are affected by the North and South magnetic poles, which are hence seen to be much more powerful than the Cornish rocks, hence if the statement *re* the Cornish rocks were true, we should expect to find the North and South magnetic poles almost hidden from view by the numbers of iron ships attracted to

them, but as a fact we have not heard of one ship being attracted to either pole!

That roughing or barbing that part of a wire nail which adjoins the head makes the nail more efficient

A whole page (179) of the *Supplement* (No. 1733) to the *Scientific American* of Mar. 20, 1909, was devoted to 'Wire Nail Fallacies,' the article being written by Dr. Robert Grimshaw. He considers a large number of cases carefully and then writes, "We thus come to the conclusion that except for nails with insignificant heads, either roughing or barbing that part of the nail which is next the head, and which remains in the upper one of the two or more pieces nailed together, is worse than useless, particularly for box lids. If we rough or barb only the lower half or the lower third of the nail (*i.e.*, that part next the point) we get, it is true, a slight extra resistance in driving, as where the roughness or barbs are at the butt end; but the holding effect—particularly with barbs—is not materially increased. . . ."

The usual marks or roughing on a wire nail near its head are due to tight grip necessary to hold it while the head is being formed.

That Water becomes Viscous under great pressure

This error is probably allied to that which implies that water is considerably more dense at greater depths in the sea, and may be due to a mistaken idea that water, like gases, is compressible. Water is only very slightly compressible (its volume is reduced 2 per cent. by the pressure due to a depth of water of 2,000 fathoms—a little more than 2½ *miles!*), and in any case the viscosity of a liquid is not affected by pressure. Viscosity *is* affected by temperature. *E.g.*, the viscosity of glycerine at 3° C. is about 5 times as great as it is at 20° C., while the viscosity of water at Zero Centigrade is about double what it is at 30° C.

That common salt put on a fresh wine stain has a chemical action on it and prevents it staining

There is no chemical action, but for all this there are two effects which are beneficial; in the first place, if plenty of salt is put on quickly it acts as a sponge, sopping up the fluid colouring matter, thus preventing it from spreading

and making a larger and deeper stain. In the second place it keeps the stain damp until the cloth goes to the wash. A dry powder would not do because it would have practically no capillary action. Salt is always more or less moist and is consequently admirable for the purpose. It is usually close at hand, too, on these unfortunate occasions.

There is a good story told of the late Prof. W. A. Spooner, of Cambridge, who was celebrated for 'Spoonerisms.' One day, when he was dining with some friends, his hostess spilt some salt on the cloth; whereupon he caught up the port wine bottle and quickly poured some of its contents on to the salt!

That Lightning never strikes twice in the same place

This idea may have arisen on the principle known as 'the resolution of the odds.' In Mar., 1915, in connection with the expected raids by German hostile aircraft, we saw it recommended in the press that persons should take refuge in a house which has been struck by a bomb, as "it was extremely unlikely that the same house would be struck a second time." This recommendation may have been made under the same erroneous impression; on the other hand it may be on a sound basis, for the conditions are different. The same aeroplane or airship is very unlikely to be taken by its pilot over the same spot, and probably the other pilots would on purpose give their attention to other places—unless indeed the place be a cathedral, university, or library, in which case bitter experience taught us that the Germans were *very* likely to drop bombs or shells on the same place! Whatever the origin, certain it is that the same place is often struck again by lightning, especially if it be in an exposed position. *E.g.*, a church on the estate of Count Orsini, in Carinthia; the church of St. Michael's, Charlestown, U.S.A.; the steeple of St. Mark's, Venice; and the colossal bronze statue of William Penn, on the City Hall, Philadelphia, U.S.A. In the last case a careful record is kept of the number of times the statue is struck.

That the hardening of Copper is a 'Lost Art'

"At short intervals there appears in our different periodicals an article telling us that somebody has found a lot of old copper tools hard enough to cut the hardest stone

and bewailing the fact that the process by which these tools were hardened by some prehistoric race is now unknown and must be classed amongst the so-called ' lost arts.' That the Egyptians and some other peoples knew how to harden copper is unquestionably true, but a chemical analysis of their tools quickly revealed the secret, and there has never been a time since when we could not produce copper tools quite as good as those of the ancients, and probably better. During his investigations into metallic alloys suitable for cutlery, Faraday produced an alloy of copper which took an edge as keen and showed an endurance as great as that of anything left behind them by the ancients. Of this alloy a razor was made which proved quite serviceable but was not equal to finely tempered steel and consequently it offered no attraction to the modern artisan. The art of hardening copper is not lost, but it has fallen into desuetude for two reasons. In the first place it is not as efficient as good steel, and, secondly, copper is too costly ever to take the place of the cheaper metal, iron, while the latter can be made to do equally good work. Careful observation shows that much of the fine stone-cutting work of the ancients was done by grinding rather than by cutting. I doubt very much whether any tool made prior to the Christian era could stand the hard work to which the picks used by the miller in dressing his mill-stones are subjected.

" This matter of the hardening of copper is a very fair sample of the erroneous ideas prevalent in regard to the ' Lost Arts,' a subject in regard to which the late Wendell Phillips was charmingly eloquent and woefully ignorant. All the arts which have fallen into disuse and are so said to have been lost have been merely abandoned because they have been superseded by something greatly better."—John Phin, p. 194, *The Seven Follies of Science,* 2nd Ed., 1911.

That large lenses are necessarily more powerful than small ones

Most large things are more powerful than small ones, and this is generally true also in the case of telescopes, hence possibly the error. But a telescope is a combination of several lenses, whereas we are dealing with single lenses, and in the case of the latter it is the smallest which magnify the most. The reason for this is that magnification can be

shown to be due to the curvature of a lens, and the smaller the radius the greater the curvature. Hence it will be at once apparent that we cannot have a large and powerful single lens (though we may have a small and weak one if the radius is large !). Even in a microscope, which is also a combination of several lenses (but which differs in principle from a telescope), the most powerful lenses ('objectives') are very small ones.

By 'more powerful' in the above sense is meant of course that the object viewed is made to look larger. When it is a question of a burning glass, that is a similar lens for lighting, say, a pipe or cigarette, then it is necessary to gather as many of the Sun's rays as possible and concentrate them on to a small area. For this purpose a lens of large diameter is the important thing, and the radius of curvature does not matter much. Hence a lens one inch in diameter may have a much greater magnifying power than one three inches in diameter, but the latter will collect *nine* times as many solar rays and will therefore be much more effective as a burning glass than the smaller one. This may have given rise to the popular error.

That an alum bath used in connection with a magic lantern is more effective in absorbing the heat rays than a plain water bath

Prof. C. V. Boys, F.R.S., in a review of a book in *Nature*, Mar. 19, 1914, p. 64, "The use of a water cell in the beam is described as a method of reducing this [heat] trouble. While the ever-repeated fallacy of alum solution finds no place here, the author or Dr. Comandon, whose work is being described, do not appear to have known of the use of a freshly prepared solution of sulphate of iron, of such a strength that its colour is just visible, as an effective heat absorber."

"If it be necessary to eliminate the heat rays, which may act deleteriously on the object, a vessel is introduced containing either water or a 5% solution of ferric chloride." —*Ency. Brit.*, 11th Ed., XVI., p. 186.

That in the case of a slanting, uniform beam, uniformly loaded, and supported, 'in the same manner at each end, the lower support takes more than half the total load'

Let PQ be the uniform and uniformly loaded sloping beam, supported on knife edges at P & Q. Let W = the

total load of the beam itself plus the load on it. Let M be the mass centre of the beam and its load. Let θ be the angle of inclination of the beam to the horizontal. At M resolve W into its components W cos θ at right angles to the beam, and W sin θ parallel to the beam. Obviously the reactions at P & Q due to W cos θ are equal (each being $\frac{W}{2}$ cos θ) and perpendicular to the beam. The other component W sin θ merely causes, or tends to cause [for our purpose we had better keep to the case in which no movement takes place] the beam to slide to the right, Q being lower than P, and as the pressure at right angles to the beam at P = that at Q, therefore the friction resisting sliding at P = that at Q, for we have assumed the supports are similar. Hence the resultant forces at P & Q are equal, the components of each being $\frac{W}{2}$ cos θ and $\frac{W}{2}$ sin θ. For the beam not to slip $\mu \frac{W}{2}$ cos θ must be $> \frac{W}{2}$ sin θ, where μ is the coefficient of friction between the beam and the supports.

If the beam is *not* 'supported in the same manner at each end,' then the forces at P & Q will not necessarily be equal. For example, if there is a notch at Q for the knife-edge and a well-oiled roller (instead of a knife-edge) at P, then the force at Q will be greater than the force at P, but if the notch be at P and the roller at Q, then the force at P will be the greater. A familiar example of the latter case is an umbrella with a hook handle hooked on to a rod at P and resting against another at Q. Hence Q may, in certain circumstances, take considerably *less* than half the total load.

That dew falls as rain does

In *Popular Physics*, by Dr. Lardner, p. 92 of the section on 'Terrestrial Heat,' we read, "When the firmament is unclouded after sunset, all the objects which are good radiators of heat, among which the foliage and flowers of vegetables are the foremost, lose by radiation the heat which they had received before sunset without receiving any heat from the firmament sufficient to replace it. The temperature of such objects, therefore, falls much below that of the air, on which they produce an effect precisely similar to that which a glass

of very cold water produces when exposed to a warm atmosphere charged with vapour. The air contiguous to their surface being reduced to the dew-point by contact with them, a part of the vapour which it holds in suspension is condensed, and collects upon them in the form of dew. . . .

" Dew will fail to be deposited even on objects which are good radiators when the firmament is clouded. For although heat be radiated as abundantly from objects on the surface of the Earth as when the sky is unclouded, yet the clouds, being also good radiators, transmit heat, which, being absorbed by the bodies on the Earth, compensates for the heat they lose by radiation, and prevents their temperature from falling so much below that of the air as to produce the condensation of vapour in contact with them. . . .

" In general, therefore, the conditions necessary to insure the deposition of dew are (1) a warm day to charge the air with vapour ; (2) an unclouded night ; (3) a calm atmosphere ; and (4) objects exposed to it which are good radiators of heat."

In an *Elementary Treatise on Natural Philosophy*, by A. P. Deschanel, Part II., p. 402, " This condensation may occur in either of two ways. Sometimes it is caused by the presence of a cold body, which reduces the film of air in contact with it to a temperature below the dew-point, and thus produces the liquefaction or solidification of a portion of its vapour in the form of dew or hoar-frost.

" When, on the contrary, the condensation of the vapour takes places in the interior of a large mass of air, the resulting liquid or solid *falls* in obedience to gravity. This is the origin of rain and snow." At p. 409, " We have already seen (p. 402) that dew does not *fall*, as it is not formed in the atmosphere, but in contact with the bodies on which it appears, being, in fact, due to their cooling after the sun has sunk below the horizon, when they lose heat by radiation to the sky." Experiments in 1885 by Aitken showed that only part of the dew formed on the ground comes from the air, the rest coming from the earth or from plants. The blades of the grass become colder than the earth under them, so that vapour rising from the ground is condensed on the cold surfaces of the grass. John Tyndall, F.R.S., in a lecture at the Royal Inst., in 1854, also dealt with this matter. It will be found at p. 129 of *Science and Education* (1917), edited by Sir Ray Lankester, K.C.B., F.R.S.

That electric glow lamps sometimes burst

To burst implies pieces flying outwards owing to expansion of contents, but there is a very high vacuum in incandescent electric lamps; consequently, while the atmosphere is always tending to crush the bulb together, there is nothing inside to help to resist this; all the air pressure thus comes on to the glass. Hence when such a lamp is broken the pieces tend to fly *in*wards—there is, in fact, an *in*plosion.

That to lag the cylinder of an engine with its own exhaust steam (at a pressure of one or two pounds per sq. inch by gauge) is better than using dry lagging such as cow-hair felt and planished steel

To lag a cylinder with its own exhaust steam seems, at first sight, a very plausible proceeding, especially if, in error, it is thought that we are comparing one so lagged with an entirely unlagged one. But we are not—we are comparing it with a dry lagged cylinder. Now if lagged with the exhaust steam the temperature of this steam would correspond practically with that of steam at atmospheric pressure. For non-technical readers it may be explained that every steam pressure (when the steam is what is called 'dry saturated') has an exactly corresponding temperature. Hence the temperature of the exhaust steam would be 212° F. and no more, but with cow-hair felt and planished steel, the temperature of the air imprisoned in the felt, and the felt itself, may rise considerably above 212° F. It would, in fact, rise nearly to the mean temperature of the cylinder walls. These are not at a constant temperature. They are hotter when the live boiler steam is being admitted to the cylinder, and cooler when the steam is fully expanded and going to exhaust. Naturally this hotter jacket would be more efficient than the cooler one due to exhaust steam.

That the temperature attained at the focus of a lens or mirror is proportional to the concentration of solar radiation

William Adams, Deputy Registrar, High Court, Bombay, did some excellent work in 1877-8 on the practical utilisation of solar energy. In fact, to the present day he appears to be the only Englishman who has tackled the problem from its practical side, and only one other Englishman—Sir John Herschel, F.R.S.—has approached it at all. Sir John made

an early determination of the value of the solar constant. He also cooked a stew by means of solar heat, but Adams, besides doing much cooking, made his sun boiler work a small engine. For all this Adams made a huge mistake in estimating the temperature of the Sun. He reflected sunshine by means of a small mirror on to a thermometer and took a reading of the temperature it recorded. Then he focused a second mirror of the same size on to the thermometer, and found the reading was doubled, and so on for several mirrors; but he did not go very far, and possibly was not particular enough in noting a small falling off in "the law." Anyway, he deduced from his experiments and those of others (of the exact conditions of which he was probably not aware) that if a lens 85 ft. 4 ins. in diam. were used to focus solar radiation on to an area ½ inch in diam. the temperature in this area would be 40,800,000 °C., whereas, in fact, the temperature of the sun itself is only 6,000 °C. ! !

The Rev. C. H. Pope (*Solar Heat*, 2nd ed., 1906) states (p. 17), "That the degree and amount of heat at the focus will be proportionate to the area of the opening of the lens or mirror, and that thus the only limit to the temperature which may be reached is the size to which such lenses and mirrors may be constructed and revolved." At p. 93 he writes, "These rays may, therefore, be gathered together, and made to unite as if they became one denser, stronger, hotter ray, so that the temperature of the condensed rays will be raised in proportion to the number of rays blended; and we can thus cause the heat to increase to any degree our apparatus can be enlarged."

Adams argued (much as Pope does) that when two streams join the flow of water is greater, and so by combining the streams of sunshine the temperature was greater. If he had said the *quantity* of heat was greater he would have been right, though, of course, up to a certain point the temperature does rise, but it can never rise above the temperature of the source. It rises until the loss by radiation from the thermometer exactly balances the radiation which the thermometer receives, and the amount of heat radiated by a body varies with the fourth power of its absolute temperature—this is known as Stefan's law. Another analogy (which is not strictly correct—practically no analogy ever is) may serve to make the matter clearer. Imagine a number of fine parallel jets of water, say, of the diameter of a small pin,

at a temperature of 150° F. Let the distance between the jets be one inch ; then it would be possible to have only one of these jets impinging on the bulb of a thermometer, and we will suppose the bulb an unusually large one, so that its loss of temperature by radiation would be great. Then the reading of this thermometer would not be so high as 150° F. Then so place a small funnel (equivalent to a lens or mirror) that *two* of the jets were made to impinge on the bulb. Double the quantity of heat would then reach the bulb, though there would be no change in the *temperature* of the jets. The reading of the thermometer would be higher, because while the quantity of heat impinging on it would be double, the loss from it by radiation would be only slightly increased. Then arrange another small funnel so that 4 jets impinge on the bulb. Four times the quantity of heat would be involved, and there would be another slight rise in the reading, and ' in the limit ' the thermometer would read 150° F., the temperature of the jets, but it could never rise above their temperature even if a large funnel combined them all into one stream. Hence no amount of concentration of solar radiation by a lens or mirror would give a temperature above 6,000° C.

That an air-vessel absorbs shock

" There is a popular notion that an air vessel absorbs shocks, but this depends entirely on the nature and origin of that shock. If the shock takes place in the body of the pump itself, as it usually does, and the air vessel is placed on the delivery main, as it often is, it is incontestable from the briefest experience, that whatever percentage of the shock the air vessel absorbs is a negligible quantity. In the old-fashioned slow running bucket and plunger pumps, an air vessel of ample capacity was a necessity to ensure a more or less uniform delivery. Its functions were, in fact, to compensate for the inequality of the discharge by means of the compression and expansion of the air it contained at each stroke of the plunger, but if the flow is constant it is obvious that its principal use ceases to exist. It is open to question what effect it has on a constant flow, and the only use it can [then] have is to rid the pump, or rather the main, of a certain quantity of air, *i.e.*, performing the function of an air trap, or pocket. On the other hand, with constant flow, great pressure and high velocity, it often appears to cause excessive

vibration, as the highly compressed air simply acts as a vibrating spring, magnifying shocks, and becoming a real source of danger if a casting fails, as the expansion of the air causes the fractured pieces to fly with great force."

The Design of Sewage Pumps, p. 61, by E. C. Bowden Smith, A.M.I.C.E., in *The Cairo Scientific Journal*, No. 90, Vol. VIII., Mar., 1914.

That by means of a large lens, the Sun can be focused to a mere point

Prof. C. V. Boys, F.R.S., in opening the discussion on the author's paper on *The Utilization of Solar Energy* at the Roy. Soc. of Arts, April 28, 1915, dealt fully with this matter as is recorded in the Jour. of the Roy. Soc. of Arts of April 30, 1915, p. 563, from which we quote the following :—

" He (Prof. Boys) noticed a reference in the paper to one of the earlier inventors who talked glibly about concentrating the heat of the Sun from an 85 ft. lens on to a circle of half an inch diameter. That was a mistake which was very common. The idea was that the Sun could be concentrated as much as one liked, and that all that had to be done was to make a lens big enough. . . . . The diameter of the Sun in the sky was, roughly speaking, half a degree, and any image produced by a lens had a definite size in relation to the size of the object. If a pocket lens were taken, that would make a minute image of the Sun about as big as a pin's head, but if a large lens was employed it could not be put to the same distance. . . . it had to be put further off, and the moment that was done . . . . the image of the Sun ceased to be a thing like a small pin's head ; it became larger. If a lens 85 feet were employed, the focus of such a lens would not be got nearer than 40 ft., and the diameter of the image of the Sun would be the one-hundred-and-twentieth part of that. One-hundred-and-twentieth part of 40 ft. was 4 ins., so that the concentration of the inventor's lens of 85 ft. into an image $\frac{1}{2}$ in. in diameter was on the face of it ridiculous and impossible."

That the ninth wave is always the largest

Tennyson, in *The Coming of Arthur* (seven stanzas from the end), refers to the above thus :—

"And then the two
Dropt to the cove, and watch'd the great sea fall,
Wave after wave, each mightier than the last,
Till last, a ninth one, gathering half the deep
And full of voices, slowly rose and plunged
Roaring, and all the wave was in a flame."

Others say the seventh is the largest, while Ovid in his *Tristia*, Bk. I., Elegy II., ll. 49 and 50, says :—

"Qui venit hic fluctus, fluctus supereminet omnes ;
Posterior nono est undecimoque prior."

That is :—

"This billow which is coming now o'ertops all billows else, for 'tis that which comes after the ninth and ere the eleventh wave."

"I had always accepted this as meaning that there were two separate wave-systems of unequal length and frequency, arising from different centres of disturbance and cutting each other at an angle ; the result being that, at more or less regular intervals, a coincidence takes place of the crests of waves in these two convergent systems—each reinforced by the other, and so causing a combined maximum. That waves other than the 9th in succession are sometimes indicated is shown by the following extract from the *Handy Book of Curious Information*, by William S. Walsh (Lippincott, 1913), 'There is a curious superstition that every tenth wave is larger than its brethren. Thus De Quincey refers to it in his *Essay on Pagan Oracles*, and on the beach at Portobello he and John Wilson jointly and zealously sought to verify this tradition concerning the *fluctus decumanus*, or tenth wave. But, he confesses, the issue of this was emptiness and aerial mockery.'

"I wrote to Dr. Vaughan Cornish saying I had failed to find any mention of this point in his various books on sea waves. He replied, saying that as the popular belief had only a literary interest he had not thought it worth noticing, but that so far as my explanation went, he thought it might stand. A wave system, he added, is hardly ever single. Therefore a periodicity is, under favourable conditions, likely to become obvious enough to form a foundation for some such popular mis-statement."—Donald Gunn.

It is of interest to know that Sir Thos. Browne refuted this fallacy in Book VII., Chap. 17, of his *Vulgar Errors*, 1646.

Vide *Ency. Brit.*, XI., p. 456.

That when an explosion takes place outside a building, the windows of it are blown in

Contrary to what one would expect, windows are blown *out* by an explosion outside the building.

There were, unfortunately, hundreds of cases during the Great War where this fact was demonstrated, namely in connection with the 20 officially recorded German air raids on England, and especially that on London at 10.45 p.m. on Sept. 8, 1915. One of the explosive bombs (for most were incendiary ones) fell about 70 feet from the back of No. 13, Russell Gardens, Golder's Green Road, N.W., on Sept. 8, and the writer inspected the premises, which were badly wrecked, within an hour of the occurrence. In certain cases, pieces of the bomb, or other solids, had been projected through the windows, in which case glass was driven inwards, but in the case of the front windows of the houses on the opposite side of Russell Gardens there was not an exception to the rule that the windows were blown *outwards*, these being protected by the other houses from splinters from the bomb. The windows of the ground floors of these houses were for the most part ' leaded ' lights, and these had made a more or less permanent record of the facts, for in *every* case the whole window bulged *outwards* towards the street, the leaded portion being partially torn from its frame, and several of the small panes being broken.

When an explosive explodes, there are two main effects which cause what we call the explosion ; (1) a large volume of gas is suddenly generated by the chemicals forming the explosive, and (2) the great heat produced causes the gas generated, and the surrounding air, to expand greatly. When the explosion takes place at or near ground level, as the gas and air cannot expand downwards on account of the ground, it has, for the most part, to move vertically upwards. The mass of air thus given an upward velocity is very great, and its speed too is high, consequently it, so to speak, overshoots itself, due to its momentum, and produces a partial vacuum beneath it. Then the air at atmospheric pressure in the houses expands, trying to fill the place where the partial vacuum has been produced, and so blows *out* the windows. In the case of windows facing the explosion and unscreened, it may be that the wave of compression which is first formed blows the windows partially *in*wards, but the vacuum is produced so quickly after this, and lasts relatively so much longer, that the windows are finally blown *out*wards.

In discussing this matter with a well known physicist, on Oct. 7, 1915, he did not agree with the partial vacuum theory explained above. His explanation of the fact that the windows were blown *out* was that in the first instance the windows are broken (inwards) by the wave of compressed air, that this comparatively high pressure air gets into the rooms through the broken windows (and possibly also down the chimneys), causes the pressure to rise in the room and then when the pressure of the external air returns to normal, the higher pressure in the room blows the window *out*.

The writer does not agree with this explanation, for if the high pressure air outside the window does not blow the whole window in, why should the air in the room (which by this hypothesis could be but slightly above atmospheric pressure) be under sufficient pressure to blow the window out? On the night of Oct. 13, 1915, London was again visited by Zeppelins between 9.15 p.m. and about midnight. A number of explosive bombs were dropped in the neighbourhood of Aldwych and Lincoln's Inn, fortunately doing little damage to buildings, but two of them have afforded excellent data in support of the author's explanation (which he believes many others arrived at before him). He visited the sites next morning between 10 a.m. and 11.0 a.m. and found a hoarding on the West side of Catherine Street, Strand. It was about 60 ft. long and 15 ft. high, and cut off a cleared site from the street, the other boundaries of the site (for a building) being formed by tall new buildings. On the opposite side of Catherine Street, towards one end of the hoarding and about 50 ft. from it a bomb had exploded on the pavement. The whole of the hoarding had been blown *towards* the bomb, and not away from it as might naturally be thought. The site for the building being open to the sky, there was no ' room ' in which the pressure could rise in order to blow the hoarding outwards in the direction stated. A still more striking case occurred in the East half of Aldwych. Another bomb had burst in the roadway. In the cleared site between Aldwych and the Strand there was a very long advertisement hoarding standing right in the open and clear of all buildings.

The bottom edge of the hoarding was about 5 ft. from the ground, and its height was about 12 ft. A line drawn from where the bomb exploded to the nearest part of the hoarding would make an angle of about 45° with the surface of the

hoarding, and the length of the line would be about 100 ft. A canvas painting about 5 ft. wide and 10 ft. high of a soldier was blown off this hoarding *towards* the bomb, and so also were several of the planks of which the hoarding was made.

The following paragraph appeared in the *Daily News and Leader* of Sept. 26, 1916, and confirms the foregoing, and the instance of the case of photographs is particularly interesting, but the explanation should be " there was not enough air in the case to expand sufficiently to blow the glass out " :—

" I received to-day ocular confirmation of the statement, which I had heard but scarcely credited, that glass broken by the concussion of a Zeppelin bomb is broken not by being forced away, but by being sucked towards the explosion, by the air rushing in to fill the vacuum caused. In a house in a London suburb a bomb had dug a deep pit in the front garden. Every window on the opposite side of the road was shattered, but a photographer's advertisement case on the pavement, twenty yards nearer the bomb pit, was intact. The explanation is, I presume (I speak under correction), that the case of photographs was airtight, and that as it was only an inch or so deep there was no air behind to be sucked. A fence of wood palings halfway between the scene of the explosion and the case had fallen flat *towards the pit.*"

That a mirage is entirely an optical illusion

" Very frequently in hot climates the layers of air in contact with the ground are more heated and less dense than those above them, so that the angle of total internal reflexion is sometimes reached by the rays of light which fall obliquely upon these layers from an object ; now such rays after reflexion entering the eye of the distant observer will give an inverted image of the object as if from the surface of a lake. This phenomenon is known as the mirage."—Balfour Stewart, LL.D., F.R.S., p. 263, *Elementary Physics.*

" MIRAGE.—An appearance as of water is frequently seen in sandy deserts, where the soil is highly heated by the sun. The observer sees in the distance the reflexion of the sky and of terrestrial objects, as in the surface of a calm lake. This phenomenon, which is called a mirage, is explained by the heating and consequent rarefaction of the air in contact with the hot soil. The density, within a certain distance of the ground, increases upwards, and rays traversing this portion of the air are bent upwards in accordance with the general

rule that the concavity must be turned towards the denser side. Rays which were descending at a very slight inclination before entering this stratum of air may have their direction so much changed as to be bent up to an observer's eye, and the change of direction will be greatest for those rays which have descended lowest ; for these will not only have travelled for the greatest distance in the stratum, but will also have travelled through that part of it in which the change of density is most rapid. . . ."—A. Privat Deschanel, *Natural Philosophy* (Part IV., p. 1108), translated and edited by J. D. Everett, M.A., F.R.S.

Vide also *Nature*, Nov. 19 and 26, 1874.

That in transmitting Compressed Air the losses are considerable

On Sept 10, 1897, my old chief, Prof. Unwin, B.Sc., F.R.S., M.I.C.E., made a report on the Taylor air compressor installed at Magog, near Montreal, Canada, and in it he wrote :—

" Compressed air can be very conveniently transmitted to a distance through pipe mains, and used to actuate many widely separated machines. As a means of distributing power to different places, at a distance from the source of power, when the distances of transmission are not very great, compressed air transmission is often cheaper and more convenient than electrical transmission. There is a common idea that in transmitting compressed air the losses are considerable. That is not really the case. There is necessarily a small pressure loss in transmission through pipes, but the effect of this on the efficiency is not great. For very great distances the cost of pipe mains is considerable, but I think in favourable cases air transmission may be used with commercial advantage up to a distance of twenty miles."

In Paris power is distributed for various purposes by compressed air much in the same manner as it is distributed in London by the Hydraulic Supply Co. In many coal mines in the United States power is distributed by compressed air chiefly for working pneumatic coal-cutting machines. In this case it aids ventilation.

That it would be a great advantage if an entirely weightless aeroplane could be made

It is well known that great efforts have been made to lighten the construction of aeroplanes and their engines, and

up to the present no doubt these efforts have been justified, but it is not generally recognised that, quite apart from the strength of the flying machine, there is a point in the reduction of weight to go beyond which it would be a disadvantage The inertia of the mass of the machine is an advantage in some ways. As an illustration, we all know how a little rowing boat is tossed about on a comparatively smooth sea while a large steamer at anchor is practically not moved under the same conditions. This is due to the very much greater inertia of the larger vessel. A *vol plané* would be practically. impossible in the case of a nearly weightless machine. For the rest we cannot do better than quote from the article on 'Flight' in the 11th ed. of *Ency. Brit.*, X., 503, where we read :—

" Weight, however paradoxical it may appear, is necessary to flight. Everything which flies is vastly heavier than air. The inertia of the mass of the flying creature enables it to control and direct its movements in the air. Many are of opinion that flight is a mere matter of levity and power. This is quite a mistake. No machine, however light and powerful, will ever fly whose travelling surfaces are not properly fashioned and properly applied to the air. It was supposed at one time that the air sacs of birds contributed in some mysterious way to flight, but this is now known to be erroneous. The bats and some of the best-flying birds have no air sacs. Similar remarks are to be made of the heated air imprisoned within the bones of certain birds. [According to Dr. Crisp, the swallow, martin, snipe and many birds of passage have no air in their bones.] Feathers even are not necessary to flight. Insects and bats have no feathers and yet fly well." p. 504 : " It may be stated once for all that flying creatures are for the most part as heavy, bulk for bulk, as other animals, and that flight in every instance is the product, not of superior levity, but of *weight* and *power* directed upon properly constructed flying organs."

That there is no water-power of any value in Great Britain

On Dec. 6, 1915, Mr. Alphonse Steiger, M.I.C.E., the well known Swiss authority on water turbines, read a paper on " The Modern Development of Water Power " before the Society of Engineers (Incorp.). At p. 1 of the paper he said, " The available water-power of Great Britain is variously estimated at from 500,000 to 1 million horse-power, the former

being a fair basis of calculation, as probably the higher figure would not be available all the year round."

Taking the half million, and assuming 4 lb. of coal per brake horse-power hour (the average for all England is more than this—such is the poor average efficiency) ; and 300 working days of 12 hours each, the equivalent quantity of coal is 3,213,300 tons per annum, which at present (Sept. 4, 1919) is worth at least £1 per ton or £3,213,300 per annum, a not inconsiderable sum even in these days when some out-of-work *casual labourers* are drawing £3 4s. 0d. a week *for doing nothing*, and the *daily* National expenditure *exceeds* the National income by over £2,000,000 !

Mr. Steiger said in his paper, " With this fact [value of equivalent coal] before us it is to be regretted that progress has so far been very slow in Great Britain, although the large power plants at Foyers and Kinlochleven should show to be devoid of all foundation the assertion (still frequently made) that there is no water-power of any value in this country. This belief, and the indifference resulting from it as regards water power, must inevitably have a serious effect on British industry, more especially on the iron and steel industry."

The following paragraph is excerpt from p. 14 of *Nature*, Sept. 5, 1918 :—

" Mr. A. Newlands, engineer-in-chief of the Highland Railway, showed in the course of a paper read at the exhibition not only that the development of our water resources will provide us with the energy that we require, but also that its proper development is to some extent bound up with the reorganisation of our industrial life. Cheap power and a greatly extended use of it are imperative necessities, and the continued neglect of the water-power possibilities of this country is a very serious economic waste. In the latest Census of Production Report it is shown that while the total horse-power of industrial engines in the United Kingdom is approximately ten and a half millions, of this only 178,000 h.p., or 1·6 per cent., is represented by water-power. In the opinion of Mr. Newlands we could easily draw upon water for one to one and a half million horse-power, or more than 10 per cent. of our requirements. A comparison of the percentage of available water-power utilised in Great Britain with that of other countries furnishes a very impressive reminder of the undeveloped state of that industry here. Germany utilises 43·4 per cent. of the water available and capable of deve-

lopment ; the United States, 24·9 per cent. ; France, 11·6 per cent. ; Great Britain, only 8·3 per cent. It is estimated that while there is available for development from water-power in Great Britain 10·9 h.p. per square mile of area, only 0·91 h.p. is actually used."

That Shrapnel Shells burst, in the sense that the shell-cases burst as do the cases of high-explosive shells

With the millions of examples of the firing of shrapnel shells that occurred during the late war, and the hundreds of thousands of men who witnessed them, this fallacy should not have a much longer life. At present, however, it is still prevalent.

There are many forms of shells and hand-grenades, the cases of which are purposely designed to split into many fragments, but the case of the shrapnel shell is designed *not* to burst ! There is a charge (fired by a time-fuse) at the back of a shrapnel shell which expels the 300 odd bullets with which it is filled, and it is desired that these bullets should go forwards in a cone-shaped formation. If the case were to burst, many of the bullets would be scattered too much sideways, or even backwards.

That if a gas could be discovered which was half the weight of hydrogen it would have double the lifting power of hydrogen

If a balloon or airship could be " filled with nothing," obviously that ' nothing ' would not weigh anything and the gross lifting power of the balloon or airship would be equal to the weight of air displaced. At the surface of the Earth a cubic foot of air weighs about 1·3 oz. : similarly a cubic foot of hydrogen weighs about 0·1 oz. Consequently the gross lifting power of a cubic foot of hydrogen is the difference between these weights, *i.e.*, 1·2 oz. and even if hydrogen weighed nothing the lifting power would be only 0·1 oz. more, *i.e.*, it would then be 1·3 oz., or less than 10 per cent. more, instead of 100 per cent. more as commonly supposed.

That when the air of a room feels dry and stuffy, it is due to an absence of moisture in the air

" When a person feels that the air in a room is dry and oppressive the feeling is generally explained as due to the re-

lative humidity or fraction of saturation of the air being low. The erroneous character of this explanation was pointed out two years ago by Dr. Leonard Hill and his colleagues of the Medical Research Committee in a communication to the Royal Society. They ascribe our sensation to the rate of loss of heat from the skin by evaporation, and have constructed a thermometer with a large bulb covered with moist fabric to measure this rate of loss under different conditions as to temperature, saturation, and speed of motion of the air, the bulb being kept at about the temperature of the human body. The agreement between the instrument and the 'feel' of the air is found to be fairly close. The subject has been carried a stage further by the work of Mr. G. T. Palmer, chief of the research staff of the New York Commission on Ventilation. He finds that our sensation is due, not to the rate of evaporation from the surface of the body, but to the difference between that rate and the rate of supply of moisture from the interior of the body to the skin. His paper will be found in the July number of the Journal of the American Society of Heating and Ventilating Engineers."—*Nature*, Dec. 27, 1917, p. 328.

That high explosives contain much more energy than any other substance

"Explosives are sources of concentrated energy, but grossly exaggerated ideas are prevalent as to the amount of that energy. It may be well to mention here that a pint of petrol can produce about four times as much energy as a pint of nitro-glycerine, the most powerful explosive in use. The difference is that the petrol requires to be mixed with large volumes of oxygen (which can be obtained cheaply by using air), and liberates its energy slowly, while nitro-glycerine is self-contained, and liberates its energy in the infinitesimal fraction of a second."—Prof. J. Young, O.B.E., A.R.C.S., F.C.S., in a paper read before The Soc. of Engs., April 7, 1919.

That some waters, containing salts, are better than others for hardening steel

"Cold water is now almost universally used (except for certain cases of oil hardening) as a quenching medium in hardening operations, but there are many more or less secret recipes still used in the workshops of this country by the

value of which the workers swear, and it is curious how wrong ideas of the effect of quenching media persist; for example, in an article in the *Daily News*, Jan. 28, 1919, describing an interview with Henry Ford, of motor-car fame, it was stated that, 'They said he was mad to sink wells, but ultimately he found alkaline water which hardens steel.'

"The temperature of the water is of some importance, and although little difference can be detected between the hardening power of water at 0° C. and 20° C., yet considerable differences are found when the temperature is higher, and with water at 60° C. or higher little hardening is obtained."

The foregoing is an extract from a paper on the *Heat Treatment of Steel*, by C. O. Bannister, F.I.C., A.R.S.M., read before The Soc. of Eng., May 5, 1919. Mr. Bannister gave several quaint instructions on the subject published in the 17th and 18th centuries.

That if the thickness of the brick wall of a room be doubled, the loss of heat through it will be reduced to half what it was

One reason why this is not so is because of the resistance there is to heat passing from air into the material of which the wall is constructed, and again from this solid substance to the colder air outside, but once it is in the substance of the wall it is conducted more easily from one layer of it to the next.

Mr. C. T. A. Hanssen dealt with this point in his paper, *Heating and Ventilating Private Dwelling Houses*, read before The Society of Engineers on Nov. 6, 1916, and recorded at p. 195 of their Transactions for that year, where it is stated, "The conductivity of a wall is for all moderate temperatures exactly proportional to the difference between the inside and outside temperatures, and it is for brick walls approximately inversely proportional to the square root of the thickness of the wall. According to the figures given in Table B, the heat-loss coefficient for brickwork and concrete is very nearly

$$k = \frac{1 \cdot 957 - 0 \cdot 0131\, h}{\sqrt{h}}$$

where k = loss of heat in British Thermal Units per square foot of wall per hour per 1° F. difference of temperature between the inside and outside air for walls facing S. & W., and h = the thickness of the wall in inches."

This means that if we wish to reduce the loss to half we must make the walls *four times* as thick !

That Paper may be overdried during cable-making operations

" In connection with impregnation there are one or two erroneous impressions which require correction. One is that paper may be ' overdried ' during cable-making operations . . .' Even now one occasionally sees modern specifications which state that cables having an insulation resistance of over —— megohms per mile will not be accepted.

" With regard to this fallacy, the author would repeat the statement which he made last year during the discussion on Mr. Evershed's paper,* to the effect that paper contains hygroscopic moisture which can be easily expelled by heat, but no constitutional or chemically combined water, *i.e.*, its vegetable structure consists of celluloses, not cellulose hydrates. Therefore, while paper may be overheated it cannot be overdried."—C. J. Beaver, M.I.E.E., in his paper on *Cables* to the Inst. of Elec. Engs., Dec. 15, 1914, and recorded in their Journal, Vol. 53, p. 64.

That you can say to a scientist, ' Discover this or that for me ' and that he can thereupon proceed right away to make the required discovery

Briefly put, if the above were true, it would mean that you can discover to order, but this is *not* the history of the majority of great discoveries, as will be found on reading that delightful combination of biography and the history of discoveries by Sir Richard A. Gregory, D.Sc., entitled DISCOVERY, *The Spirit and Service of Science* (1916). Many *inventions* have been made more or less to order. A man may require a machine to do a particular kind of work, and he sets to work to design such a machine ; but the discovery of the laws of Nature is a different matter, and such great additions to our knowledge have usually been made by men (and women) doing research work for the sheer pleasure of it. They may even set out with the intention of trying to find out some particular thing, but in the course of their work they are led to follow something else which is suggested to them by some of the earlier results obtained, and this side issue may yield

* S. Evershed : *Characteristics of Insulation Resistance, Journ. I.E.E.*, Vol. 52, p. 51, 1913.

better results than were expected from the research as originally outlined by them.

Sir Ray Lankester, K.C.B., F.R.S., writing in the *Daily Telegraph*, Dec. 15, 1914, said, "There is a widespread but erroneous belief that you can hire a scientific discoverer and then say to him, 'Discover me this,' or 'Discover me that,' and that he will thereupon proceed right away to make the discovery which you want . . . But valuable and important scientific discovery cannot be produced in response to orders given and money expended. You cannot manufacture scientific discovery like soap."

Sir Joseph J. Thomson, O.M., P.R.S., D.Sc., was the Chairman of a Committee appointed by the Prime Minister in August, 1916, to inquire into the *Position of Natural Science in the Educational System of Great Britain*, and his Committee issued their report on Feb. 19, 1918, consisting of 86 foolscap pages of printed matter. In the author's opinion it is a report of the greatest national importance, and he hopes some, at least, of his readers may read it and assist in carrying out its recommendations. At p. 66 the following will be found: "The importance of research in pure science, the life blood of applied science, is recognised on all hands, and there is general agreement that it ought to receive more encouragement from the nation than it has done in the past. It is as difficult, however, to organise the highest type of research in pure science as it would be to organise a method of producing great poems. The greatest advances in pure science are often the outcome of investigations which, until they are justified by success, appear fantastic and unpromising, and meet with little approval from orthodox scientific opinion, and it is often, too, a long time before any tangible results are obtained. . . . One cannot hope to get great discoveries simply by paying for them."

That all explosions are accompanied by a loud noise

When a bomb explodes, or a gun is fired, or a cork is blown out of a champagne bottle, there is in the immediate neighbourhood of the event a large increase in the volume of gas and air. This causes a sudden wave of compression in the air which travels outwards in all directions, and when it acts on our ears we hear an explosion. But suppose the explosion were confined in a very strong airtight vessel, so that nothing could get out of it, however great the pressure,

and that the sides of the vessel did not yield appreciably, then obviously no increase of volume would take place outside the vessel, and no wave of compression would be started. Consequently none could reach the ears, and we should not hear the explosion, but the latter would have occurred for all that! We have a well known example of this in the case of gas and oil engines. In these engines the most explosive mixture of air and gas, or air and oil is used, but the result, on our ears, even with large size engines, certainly cannot be described as a noise in anyway comparable with what is usually called an explosive noise. When close to the cylinder a curious and characteristic liquid 'flick' can be recognised, and that is all. As a fact, when a big naval gun is fired, the explosion has taken place a small fraction of a second before the shell leaves the muzzle, but the sound is not heard until the shell does leave the muzzle, for the reason just given, though in this case there is some compression of the air before this, owing to the rapid forcing of the air out of the gun in front of the shell.

In the *Times Engineering Supplement*, Mar. 26, 1915, there was a two-column article on *The Inflammation of Fire-damp*, from which we extract the following—it is speaking of a prosecution by the Home Office:—". . . another [expert], whose *dicta* brought down the house (and decided the case) held that an explosion must be accompanied by a loud noise, and that the absence of noise (other than the man's shouting) during the episode at the colliery stamped it as an ignition only, or, as he preferred to call it, an inflammation.

The idea that an explosion must be accompanied by a noise is the popular idea; hence, no doubt, its success when paraded in a Court of Law. It is entirely fallacious."

That forest or prairie fires are sometimes caused by the action of the Sun's rays on natural substances

In the *Evening News*, Aug. 13, 1912, it was stated that the heat in St. Petersburg had caused forest fires, and in the *Daily Mail*, June 12, 1919, an account was given of extensive fires on the Yorkshire moors which were said to have been caused by the Sun. Again it may be a question of terminology. If it is meant that the fires would not have occurred if there had not been so many weeks of brilliant sunshine as there have been for the past 40 days, then we agree. But if it is meant that the fires are directly caused by the

Sun's unaided action, then we certainly do not agree. Lighted matches, cigars and cigarettes are often thrown down on the ground, and with the moors in their usual condition the vegetation does not catch fire, but after several weeks of very dry weather much grass has been killed and is quite dry, so that a lighted match immediately sets it on fire. Even in Egypt, the maximum temperature on the surface of the sand, in the sunshine about 1.0 p.m., which the author recorded during July and August, 1913, was not more than 140° F., which is far below the ignition point of dry vegetable matter.

Sir Francis Bacon refutes this fallacy in the second book of his, *Novum Organum*, section No. 14 of 'Degrees of Heat': "The heat of the Heavenly Bodies, even in the warmest climates and seasons, never reaches such a pitch as to light or burn the driest wood or straw, or even tinder without the aid of burning glasses."

That when a tunnel is made through hard rock there is no pressure on it due to the superincumbent earth and rock

It is pretty obvious that the cause of this mistake is due to confusion of two principal facts connected with the problem. The tunnel being made in hard rock probably does not need lining and the mind dwells on the great strength of the rock and feels certain it will not crush in. Then it thinks of the rigidity of the rock above and the 'arching effect' and the fact that the tunnel probably won't crush in, and hence argues 'Then there can't be any pressure.' The fact is that the load on the tunnel is the weight of the wall of rock or earth above it equal in thickness to the outside width of the tunnel, and of the actual height of the material lying above the tunnel. Before the tunnel was made the load due to this weight was taken by the rock cut out to make the tunnel and transmitted to the rock below, it now forming the floor of the tunnel. The tunnel having been made, the load above it is the same as before, but its weight is no longer supported by what is now the floor of the tunnel. Instead of being so supported, this load, due to the effect of the arch of the tunnel, is transferred to the rock forming the sides of the tunnel, which sides consequently now have to bear a greater load than they were bearing before the tunnel was made.

Even if the tunnel be made through clay the principle is the same, only then the lining of the tunnel takes the load which formerly was taken by the clay removed to form the tunnel. In the tunnel through rock, the rock immediately surrounding the tunnel forms the equivalent of the lining.

That it takes the same draw-bar force to pull 4 loaded ' 10-ton trucks ' as it does to pull one loaded ' 40-ton truck '

This seems at first sight to be merely a question of rule of three or proportion. A 10 ton truck when empty weighs about 6 tons. When fully loaded, therefore, it weighs 16 tons. It has four wheels attached to two axles, and there are four bearings. The four loaded 10 ton trucks will thus weigh 64 tons, and they will have 16 wheels and 16 bearings. Each wheel and bearing cause their due proportion of the draw-bar pull depending on the load on them.

The tare (or weight when empty) of one 40 ton wagon is about 18 tons. Therefore when loaded it will weigh only 58 tons. Such a wagon has a bogie at each end, each with 4 smaller wheels, or only 8 wheels altogether, and the same number of bearings. The smaller total load and the fewer wheels and bearings (where the friction occurs) in the case of the 40 ton wagon cause the draw-bar pull to pull it along to be less than that to pull the larger total load on the greater number of wheels in the case of the four smaller wagons.

That the resistance of the water to the propulsion of a submarine is greater when the submarine is completely submerged than when it is at the surface

" It may be stated that the resistance to propulsion of a submarine under water is less than half that on the surface, and this in spite of the drag caused by the conning tower and other excrescences, together with the increased skin friction. The reason for this remarkable feature is that the resistance to a ship on the surface is largely caused by the waves thrown up during its passage through the water. When submerged no waves are produced, and the resistance consists entirely of skin friction. The above statement is amply supported by tests of the powers needed to propel a submarine on the surface and under water over a range of equal speeds. Then, again the speed on the surface is 17 knots, as against only 11 knots under water, and the resistance varies roughly with

the cube of the speed."—Mr. W. O. Horsnaill, *The Electrical Review*, July 2, 1915, p. 3.

That hair and worsted will not felt

In reviewing *Wool*, by Frank Ormerod (1918), *Nature*, Jan. 9, 1919, at p. 363, said :—

" The writer's statement that hair will not felt is obviously based on secondhand knowledge, which is untrustworthy ; again, the idea that the serrations help to bind the fibres together has now been brought seriously into question. That worsteds will not felt was taught for years in our technical institutes, but thousands of pieces of worsted are now ' milled ' every day in the West Riding of Yorkshire alone."

That the weird painting of the hulls of ships during the European War was for the purpose of rendering them less visible

Those who have seen examples of such dazzle painting (to give it its correct and descriptive name) and who were under the impression it was done to render them less easy to see must have found difficulty in persuading themselves that that effect was in fact obtained ! In the author's experience they were more conspicuous, but this was not the object in view. We cannot do better than quote from a letter of the originator of this practice (we nearly wrote ' art '!), which appears at p. 304 of *Nature*, June 19, 1919, where Lt.-Com. Norman Wilkinson states, " ' Dazzle-painting,' so called officially, had one purpose in view only, viz., to upset a submarine commander's estimate of a vessel's course when carrying out an attack with torpedo. . . The accurate estimation of a vessel's course is the prime factor required by a submarine commander to ensure successful attack. . . My contention throughout has been that the degree of visibility of a vessel was of little consequence provided she could be seen at all."

The speed as well as the course of the prey is important, hence some ships had bow waves *painted* on their bows to give a false idea of her speed, for the larger a real bow-wave the faster the ship is moving ; consequently if a large bow-wave is *painted* on the bow and the ship travels more slowly than this fake bow-wave implies, the torpedo will probably be sent in front of the vessel instead of into her.

The reason for the existence of this fallacy is that dazzle-painting has been confused by some with camouflage.

The latter is in imitation of protective coloration, of which such beautiful examples are found in the insect and animal kingdoms. Examples of natural protective coloration may be seen in the central hall of the Natural History Museum at South Kensington.

The author is not aware of any examples of dazzle painting in nature.

Airship and aeroplane hangars, guns, ammunition factories, etc., were subjected to camouflage, *i.e.*, they were painted or covered in such a way that they matched their surroundings and were thus made difficult to see. There is a vast difference between dazzle-painting and camouflage and these terms should not be confused, if for no other reason than that it is convenient to have two distinct terms for two distinct things.

Another extremely natural confusion in this matter : there are *two* Norman Wilkinsons, the one above-named, of the Navy, and the other, who was engaged on camouflage for the Army ! The latter in private life is an artist and theatre designer.

That when tobacco smoke is blown through a handkerchief, the yellow mark produced is ' due to nicotine '

The yellow mark is due to tar, not *coal*-tar, of course, but tobacco-tar. If nicotine existed in tobacco in such quantities as the tar then it would be practically impossible to smoke tobacco, for nicotine is extremely poisonous.

Sir Ray Lankester, K.C.B., F.R.S., p. 124, *From an Easy Chair* (1909), " A curious mistake, almost universally made, is that of supposing that the oily juice which forms in a pipe or at the end of a cigar is ' nicotine,' the chief nerve-poison of tobacco. As a matter of fact, this juice, though it contains injurious substances, contains little or no ' nicotine.' Nicotine is a colourless volatile liquid, which is vaporised and carried along with the smoke ; it is not deposited in the pipe or cigar end except in very small quantity . . A single drop of pure nicotine will kill a dog."

That pasting strips of paper on window panes prevents their being broken by violent explosions

During the latter part of the European War (1914-18), when London was frequently subjected to bombing air raids, it was a common sight to see window panes each with two

strips of paper pasted diagonally from corner to corner across them. The only possible advantage this could be is that it might prevent the broken bits of glass from scattering quite so much, and thus save damage to, say, the eyes of people passing at the time of the explosion, but the effect in preventing the glass being blown out by the explosion would be microscopic.

" Papered Window Joke.

" To-day people are looking with some amusement at the windows crossed with intricate patterns in paper strips. Experiments made by a committee of experts with explosives have proved that the papered window breaks as easily as the plain. The newspapers are now asking who started the idea."—*Daily Mail*, July 10, 1918.

That luminous paint contains phosphorous

This erroneous idea is very natural as there is a most hopeless confusion in the terminology of the subject. Bearing in mind the fact that there is not any phosphorous in luminous paint, we find in the *Harms. Ency.* under ' Luminescence,' " the phosphorescence of luminous paint," while under ' Luminous paint ' we find, " The earliest of these substances was ' Bologna phosphorous,' which consisted of impure barium sulphide, obtained by heating barium sulphate with carbon. Canton's phosphorous, which is calcium sulphide similarly prepared, and the corresponding strontium sulphide, also act in the same way, the effect produced being largely dependent on the presence of traces of other substances, such as manganese or bismuth."

Thus we see use of the word ' phosphorous ' in these names is entirely misleading as they do not contain any phosphorous.

These luminous paints are not self-luminous, hence they have to be exposed to light for some time, and thereafter they continue for a few hours to give off a faint light which gradually diminishes. Radium is self-luminous, *i.e.*, it does not require to be exposed to light in order to make it luminous.

Substances which, after exposure to and removal from the action of sunlight, appear to be self-luminous are called *phosphorescent.*

The metallic sheen exhibited by *certain* insects glass and feathers, and the colours of rainbows and soap bubbles, and which are *not* due to pigments, is *iridescence.*

The property which some substances and solutions have of appearing ' phosphorescent ' *while subject* to certain rays of light, such as ultra-violet, is *flourescence.*

That the velocity of sound in air increases with the density of the air

" There is no mistake more common than to suppose the velocity of sound to be augmented by density. This mistake has arisen from a misconception of the fact, that in solids and liquids the velocity is greater than in gases. But it is the high elasticity of these bodies, *in relation to their density,* that causes sound to pass rapidly through them. Other things remaining the same, an augmentation of density always produces a diminution of velocity. As in air of constant temperature elasticity and density vary in the same proportion, and act oppositely, the velocity of sound is not affected by a change of density, if unaccompanied by a change of temperature."—John Tyndall, F.R.S., p. 24, *Sound* (1883).

That rain, hail, and snow stop sound

John Tyndall, F.R.S., investigated this matter experimentally and recorded the results fully in his classical work *On Sound,* in which the account will be found at pp. 324-8 and 357 of the 1883 edition. At p. 327, he says, " To rain, in short, I have never been able to trace the slightest deadening influence upon sound. The reputed barrier offered by ' thick weather ' to the passage of sound was one of the causes which tended to produce hesitation in establishing sound-signals on our coasts. It is to be hoped that the removal of this error may redound to the advantage of coming generations of seafaring men." [This is an illustration of a decidedly harmful effect of a P.F.] At p. 328, " We had thus the conjunction of the two agents [thick fog and deep snow] which have been considered the most hostile to the transmission of sound. Nevertheless, the acoustic transparency of the air on this day was extraordinary."

That a clear atmosphere assists the transmission of sound

To a certain extent this is the converse of the P.F. that Fog stops sound, *q.v.*, but Tyndall dealt with it separately in the summary of his lecture VII. in *Sound* (1883), at p. 357,

where he says, "*Acoustic clouds*, in fact, are incessantly floating or flying through the air. They have nothing whatever to do with ordinary clouds, fogs, or haze. The most transparent atmosphere may be filled with them ; converting days of extraordinary optical transparency into days of equally extraordinary acoustic opacity.

"The connection hitherto supposed to exist between a clear atmosphere and the transmission of sound is therefore dissolved."

That the beautiful colours of peacocks' feathers are due to colouring matter (pigment) in the feathers

There is no pigment in peacocks' feathers, such as might be extracted by alcohol or some other solvent.

Some green feathers are due to a layer of yellow pigment on a non-pigmented (*i.e.*, mechanically or structurally produced) blue feather, and with care this layer can be removed by scraping or by dissolving in alcohol, leaving the blue underneath.

The iridescent colours of mother of pearl are also not due to pigment, but to the structural formation of the surface, and it is even possible to take an impression in wax of mother of pearl, which wax impression exhibits colours !

The absence of pigment is not confined to peacocks' feathers ; other illustrations are the common soap bubble, the colours of butterflies' wings, and of beetles' wing cases. The soap bubble is the most satisfying of these illustrations for those who do not want to go deeply into the problem, for to produce a soap bubble we use colourless water and practically colourless soap. The resulting solution is to all intents colourless, but when in the form of a soap film the most gorgeous and pure colours are seen. For this purpose, better than the ordinary *spherical* soap bubble is the *flat* soap bubble film used in connection with a beautiful and scientific toy invented by Prof. C. V. Boys, F.R.S., and known as the Rainbow Cup. Suppose by means of this we have obtained a lovely blue film, if a piece of white paper then be placed on the film it is of course not coloured blue by it, and if we move our point of sight so that we look at the film at a different angle the colour will change, though, of course, no change has taken place in the film itself.

Those who wish to follow up the matter might read the articles on ' Colour ' and ' Interference ' in the *Harms. Ency.*,

the chapter on the 'Colour and Thickness of Bubbles' in the new and enlarged edition (1912) of Prof. Boys' *Soap Bubbles and the Forces which Mould Them*, and "Structural Colours in Feathers," by Prof. Wilder W. Bancroft, in *Nature*, Aug. 18, 1923, p. 243.

That thunder turns milk and beer sour

Before we go any further: do you mean thunder, or did you mean to say lightning? !

Thunder is a noise due, in the first instance, to the extremely sudden heating of the air by the passage through it of the electric discharge called lightning. The effect of this is to produce an explosion, that produces a sound wave, which in turn suffers many reflections from the various *acoustic* (invisible) clouds in the atmosphere, thus producing the characteristic rumble of thunder. Thunder is thus a mere vibration of the air and does not affect its constitution or composition in any way, and therefore cannot have any effect on the milk or beer. But lightning probably does affect the composition of the atmosphere, and the resulting constituents may have a souring effect on milk and beer.

The souring of milk consists in converting the milk-sugar into lactic acid.

Lactic fermentation, according to Pasteur, is caused by the development in the mass of a microscopic fungus, consisting of cylindrical cells which are far smaller than those of saccharomyces, the ferment producing alcohol.

Vide the P.F. *re* iron bars placed on beer barrels.

That the Tonnage of a Ship is either its weight, or the weight of the cargo it can carry

If a ship could be placed on a pair of scales its weight (invariably expressed in tons) would be what is technically known as its *displacement*. This name has been given to this quantity because when that ship is afloat the quantity of water which it has displaced weighs exactly the same as the ship. It does not matter whether it is in salt water or fresh water, for the latter being lighter than the former, the ship displaces just so much more of it as makes the *weight* of the displaced water the same in both cases.

The weight of the greatest amount of cargo which a ship will safely carry is known as its *dead weight carrying capacity*

or *dead weight tonnage*. The load which a ship can carry depends partly on the density of the material carried, density being the mass of the material in, say, pounds per cubic foot. In other words, if a ship can carry its holds full of iron ore, then on filling its holds with timber or cotton, the load will not be so much. Hence, it has come about that the *dead weight tonnage* is *not* the actual weight of any particular merchandise which the vessel can carry, but the weight in tons it could carry if every 40 cub. ft. of the material carried weighed one ton, and the material was of such a nature that there would be no waste spaces in the holds.

It may be noted that 35 cub. ft. of sea water weigh a ton, which partly explains why 40 cub. ft. are taken as equivalent to a ton of carrying capacity. The 40 cub. ft. allow something for the space occupied by the structure of the hull.

In the case of men-of-war, the tonnage is always the weight of water displacement, but when merchant vessels are under consideration it is necessary to distinguish between gross tonnage and net tonnage, and neither of these is really a weight; hence, the term tonnage is misleading.

The gross and net tonnage are calculated in accordance with the somewhat elaborate rules given in the Merchant Shipping Acts. Roughly the *gross tonnage* may be defined as the volume (in cubic feet) of the space in a ship below the second deck from the bottom, plus any other cargo space, divided by 100, while the *net tonnage* is the gross tonnage less the tonnage (also calculated at 100 cub. ft. to a ton) of the space occupied by the engines, boilers, captains' and crew's quarters, chart house, etc., as set forth in the Acts, and known as the navigation space.

Gross tonnage is sometimes and confusingly called the gross registered tonnage, and net tonnage is similarly known as the net registered tonnage, or *registered tonnage*, this being the important quantity because on it dock, canal, and other charges are based, whence it is recorded in an official register.

In the case of a merchant ship, the dead weight carrying capacity in tons is about 50 per cent. more than the gross tonnage, and ordinarily when the tonnage of a merchant vessel is spoken of, it is the (net) registered tonnage which is meant.

None of the foregoing applies to yachts, the rules for which are not "to be understanded of the people!" [The fact is I have failed to understand them myself!]

That when electric energy is generated by water-power it costs practically nothing

The following letter appeared in the *Daily Express* of March 4, 1919:—"Your correspondent 'Electron' is apparently a victim of a *popular fallacy*, that, since the power is provided free, electricity obtained from water-power costs next to nothing. This in practice is found to be far from the truth. It should be remembered that coal is also provided by nature 'free,' the only cost being that of working and transporting it. In the case of water-power, the corresponding cost is very largely interest on expensive plant.

"By all means let us have cheap and plentiful electric power, and let us use it for all purposes in the home, but electricity cannot be definitely substituted for coal, as 'Electron' suggests, since coal is a natural source of power and electricity is merely a converted form. It will probably be found that in most cases in England a large supply of electric power can be produced more cheaply from coal than by means of water-power.

"The ideal conditions for securing cheap electric power are: (1) large and continuous demand, *i.e.*, night as well as day; (2) comparatively few very large generating stations, since large generators are much more economical than small ones—so that 'Electron's' idea of erecting a power station wherever there happens to be a waterfall is financially unsound. These central generating stations should, of course, employ the cheapest form of natural power available; as previously pointed out, in practically all cases this would be coal. The stations should be equipped with the most efficient and up-to-date apparatus for burning the coal to the best advantage, and with the minimum of smoke; thus the plea for purer air in our cities and large towns is satisfied. F. T.

"Christ's College, Cambridge."

The author endorses the explanation of the fallacy, namely, that the hydro-electric plant is very expensive and needs some men in attendance like any other plant, so that the resulting electric energy certainly does not cost "next to nothing."

That when a body having one end or edge blunt and one sharp is moved through air, it offers less resistance to the air when the sharp end or edge is in front than when it is behind

This is what the self-styled practical man would think and does think, but experiment and theory show that the

resistance is less when the blunt end or edge is the leading one. Hence, it will be noticed that our airships have blunt noses compared with their tails. If the blunt end were behind, the air would not close in at the rear so readily and a partial vacuum would be formed there which would have the effect of adding to the resistance offered by the air to the movement of the airship. When the blunt end leads the stream lines of air are not broken, but close in gradually on the ship's tail and thus maintain the pressure on the stern or tail, thus assisting the forward motion. For the same reason all the struts, and even wires, of aeroplanes which are subject to the action of moving air are made blunt at their leading edges and sharp at the trailing edge. The wings, too, are similarly shaped.

That the tone of bells is greatly improved by the addition of silver to the metal of which they are cast

Speaking of bell-metal in a footnote at p. 29 of *Sound* (1891), Dr. W. H. Stone says, "A common mixture is 13 copper by weight to 4 tin, or by an admixture of zinc, and possibly of silver, although the traditional stories as to the effect of the latter metal seem to a great extent imaginary."

The 'silvery' tone of a bell is a common expression.

That there is such a thing as chance

"*So we profess ourselves to be the slaves of chance, and flies of every wind that blows.*"—The Winter's Tale, IV., iv., 539.

"*All nature is but art, unknown to thee;*
All chance, direction, which thou canst not see;
All discord, harmony not understood;"
Pope's "Essay on Man," Ep. I., 289.

"*There is no such thing as chance; and what seems to us mevest accident springs from the deepest source of destiny.*"—Schiller.

"It is strictly and philosophically true in nature and reason that there is no such thing as *chance* or accident."—Clarke, *Sermons*, I., 98.

"The Bible takes quite as strong ground as the physicist on the side of law. The weather is not with it a matter of *chance*, or the sport of capricious demons. God arranged it far back in the work of Creation."—Dawson, *Nature and the Bible*, p. 60.

We all use expressions involving the use of the word 'chance' and these uses of the word are both convenient and understood, but most who use them verily believe that there is such a thing as absolute chance, and therein lies the error, for the above poets are right—*everything happens by law*, though in a vast (but lessening) number of cases we have little, if any, idea what all the laws are which cause the result that for convenience, and by reason of our ignorance, we call chance.

In a few cases we do know the laws and then can calculate the chance or probability exactly, and it is a remarkable fact that human instinct or judgment in estimating certain chances has been subsequently proved to have been wonderfully accurate. On this point, see *Ency. Brit.*, *sub* 'Probability.'

The mathematical treatment of probability has been developed to a remarkable degree by a number of the greatest mathematical geniuses, but for those who cannot tackle such advanced treatment of the subject we recommend *Choice and Chance* (1872), by W. A. Whitworth, M.A., in which the subject is treated arithmetically and in a fascinating manner.

That there is such a thing as cohesion *per se*

The term cohesion is usually used as a synonym for tenacity of a small amount. It is the force with which the particles of a body hold together. Now it is commonly thought that even if there were no force which is called gravity, the cohesion or tenacity of a body would remain exactly the same, whereas one accepted theory of cohesion is that it is exactly the same as the force of gravity and that consequently if there were no force of gravity nothing would hold together; everything would become impalpable dust—atomic dust!

Newton was the first to discover the law of gravitation, namely that the mutual attraction between two bodies m and m', at a distance d between their centres, is directly proportional to the product (mm') of their masses, and inversely proportional to the square of the distance d between them. Thus if the force of attraction between two bodies is one ounce when they are a distance d apart, then when the distance between them is doubled, the force of attraction will be only one *quarter* of an ounce.

Mathematically expressed we say the attraction varies as $\frac{mm'}{d^2}$

This law holds for all substances, for all quantities, and for all distances. Consequently, while usually when we speak of the force of gravity we mentally picture two or more distinct masses separated by some other substance such as air, there is no need for them to be so separated, nor need they be different kinds of material. Hence if we picture two atoms of iron, say, their masses may be considered as the same and their dimensions extremely small, so that if they are at a perceptible (even only to a microscope) distance apart, the force of attraction will be extremely small. But the atoms being so small can be placed *very* close together, even touching, in which case the distance between their centres will also be extremely small. Suppose two equal atoms at a distance $2d$ between their centres and that d is so small it is equal to the diameter of one of the atoms. There will then be a certain mutual attraction between these two atoms, the surfaces of which are only one atom (d) apart at their nearest points of approach. If this distance be made nothing, that is if the atoms now be placed in contact, the distance between their centres will be only d, *i.e.*, *half* what it was before and the attraction between the particles will be *four times* what it was before. Hence we see that as the atoms get nearer each other the force between them increases very rapidly, and if the atoms are dense, *i.e.*, are small for their mass, then when placed in contact the distance between their centres is still less and the attraction between them still greater. It is thus seen that *if the atoms are only dense and small enough and are once placed in contact they will be held together by their mutual attraction.* On this theory the difference of tenacity or cohesion of different materials depends on the size and density of their atoms. This principle has been experimentally verified to a certain extent.—*Vide* Dr. Herbert Chatley's papers to the Physical Soc. of London.

That a photographic dark-room must be painted a dead black inside, and that every article in it should also be black

If there is no source of light in a room and no light can get into it through the doors, windows, or other apertures, then there is complete absence of light in that room even

if it is painted with a glossy white paint, and complete absence of light is perfect darkness. Now optical laboratories are properly painted dead black because the experiments conducted in them are usually with ordinary 'white' light, and if any of this escaped in the wrong direction and was reflected from the walls or fittings back on to the experimental apparatus it would most likely introduce an error into the results of the experiments. But in the case of a photographic dark-room the only light used is red, which is non-actinic on a photograph or its negative, and so it does not matter how many times the red light is reflected from the walls or fittings in the dark-room on to the plates, films or photos. Hence the trouble and expense of painting the dark-room black may be avoided provided there is no infiltration of light from the outside which would be dangerous (though less so) even were the interior dead-black. Sinks and dishes are usually white, but of course have no photographic action.

The interiors of cameras and optical instruments are dead-black for a similar reason that optical laboratories are.

That 'Darwinism' and 'evolution' are practically synonyms

"Darwinism may be defined as the doctrine of natural selection, or the survival of the fittest, as put forth by Charles Darwin in *The Origin of Species* (1859). Popularly it is usually regarded as equivalent to the theory of evolution, often considered only in its application to one organism—man; but, as has been frequently pointed out, this view of Darwinism is entirely incorrect. Its novelty lay, not in the conception of evolution (a doctrine already familiar to philosophers), but in an exposition of a probable cause of evolution so clear and cogent as to remove the theory from the sphere of philosophical speculation to that of practical life."—*Harms. Ency.* (1906), Vol. III., p. 516.

That in the case of a thin elastic strip, fixed at the top end, and swinging freely in a vertical plane, the maximum bending moment occurs at the point where the strip is fixed

The equation $M = x(l-x)^2 = x^3 - 2lx^2 + l^2x$ will be found at p. 401, example No. (14), of Hall & Knight's *Elementary Algebra*, where

M = the tendency to break = bending moment.
x = the distance in inches from the fixed end.
l = the length in inches of a thin strip.

That is, this equation gives the bending moment (or tendency to break) at any given horizontal section of the strip at a distance x from the end by which it is fixed. Using his equation to plot the bending moment curve for the whole strip, we find the bending moment is zero at the free end of the strip and that it is also zero at the point of support, while it reaches a maximum at the section of the strip one-third of its length from the fixed end. This is certainly an unexpected fact, which even some engineers have difficulty in seeing! The reason for thinking the maximum tendency to break is at the point of support is probably because one thinks of the starting of the oscillations. To start the swinging, of course, the strip has to be pushed or pulled to one side and then released, and while it is being pulled aside the maximum bending moment *is* at the point of fixing, but when it is oscillating freely after being released then the greatest tendency to break is at the section one-third the length from the fixed end.

We may find the value of x which makes M a maximum by the usual process of differentiating the above expression and equating the result to 0. Thus $\frac{dM}{dx} = 3x^2 - 4lx + l^2 = 0$. Hence $x = \frac{1}{3}l$ gives the maximum value of M as before. Thus if the strip is 9 ins. long, as in Hall & Knight's example, then the maximum bending moment occurs 3 ins. from the fixed end.

That fresh drinking water may be got by melting ice obtained from any iceberg

There are two kinds of icebergs, *viz.*, those formed of (1) frozen sea-water, and (2) frozen fresh water.

The latter are portions of glaciers which have broken off where the glacier extends into the sea, and reasonably fresh water can be obtained from them. When sea-water freezes any small portion of clear ice, if washed in fresh water, contains very little salt, but taking an iceberg as a whole, its ice contains far too much mechanically entrapped salt water for the resulting water to be fit for human consumption. This is more apparent when it is realised that as salt is largely

excluded in the process of freezing, the water which is left unfrozen contains a higher percentage of salt than ordinary sea water, and it is this extra salt water which is entrapped in the freezing. About $\frac{4}{5}$ of the salt which was originally present is rejected during the process of freezing.

That when a person has been killed by lightning near a tree, a kind of photograph of the tree is sometimes found on the victim's skin

At p. 881 of Quain's *Dictionary of Medicine* (1902) we find *sub* 'Lightning, effects of,' "Patches of erythema, uticaria, superficial ecchymoses, and scorchings of the surface having a curious tree-like and branched arrangement, have all been described; and this last phenomenon has apparently given rise to the assertion that delineations of trees standing in the neighbourhood of the accident have been traced photographically on the body of the victim."

A case of this kind was reported in the *Evening News*, of September 17, 1919. Percival Simpson had been killed by lightning while standing under an elm tree in Finsbury Park, on Sunday, September 14, 1919, and it was stated by Dr. Newell that "an exact impress of the tree under which Simpson had been standing" was found on his body. It would need a *very* careful investigation to be sure of the "exact impress" under the conditions named. We prefer the explanation given by Quain, especially as when people have been killed by lightning on board ship, or in other places where there were no trees, the same tree-like markings have been observed.

That the axis of a shell in flight always remains parallel to the axis of the gun from which it is fired

This would be true *if* there were no resistance due to the wind, but as there is a very considerable resistance due to the air and the speed of the projectile, the axis of the shell nearly coincides with the tangent to the curved path of flight, technically known as the trajectory. As the trajectory is a curve, there is always an angle of lag between the axis of the projectile and the tangent to its path of flight.

Vide p. 502, *The Engineer*, June 16, 1916.

That salt water will not put out a fire

It would be interesting to know how such a curious and unlikely idea got abroad. When a steamer founders at sea and the sea water reaches the boiler fires these are undoubtedly extinguished by the sea-water and in the process a considerable volume of steam is rapidly produced which has given rise to the fallacy that the boilers burst.

There are also many fire 'floats' in the estuary of the Thames and other rivers which of course draw the water they use from that in which they are floating, and many fire engines bear the following instruction, "After using this engine for salt water, flush it out well with fresh water." The reason for this instruction is because of the corroding action of salt water.

That the weight of steam discharged through a nozzle is always greater the greater the difference of pressure between the two ends of the nozzle

This is another case of a reasonable mistake, but, therefore, all the more dangerous as it is unsuspected. In some pocket-books and works on steam, tables of the measured discharge of steam will be found. From one of these the following table is copied :—

Absolute pressure in lb. per sq. inch in the boiler.	Pressure in lb. sq. in. into which the steam was discharged.	Actual velocity of the steam in ft. per sec.	Weight of steam discharged per sq. in. of orifice in lb. per min.
75	74	230	16·68
75	72	401	28·35
75	70	521	35·93
75	65	749	48·38
75	61·62	876	53·97
75	60	933	56·12
75	50	1,252	64·00
75	45	1,401	65·24
75	43·46	1,446·5	65·30
75	15	1,446·5	65·30
75	0	1,446·5	65·30

The foregoing are actual experimental results obtained by Brownlie and reported by D. K. Clark.

It will be seen that the boiler pressure was kept constant, and the pressure against which the steam was discharging was

gradually reduced from 74 lb. sq. in. to zero. The quantity discharged does increase until the lower pressure is 43·46 lb. per sq. in., at and after which both the velocity and quantity remain constant at 1,446·5 ft. per sec. and 65·3. lb. per min. respectively.

It will be found that 43·46 is 58 per cent. of 75 ; and this is the critical ratio. That is, the quantity of steam discharged increases as the ratio of the pressures decreases until this ratio has fallen to 58 per cent., but after that the quantity is constant, even though the back pressure be reduced to nothing.

The reason for this paradox is that steam is highly elastic. For example, at 75 lb. per sq. in. abs. pressure 1 cub. ft. of steam weighs 0·1,792 lb. At 70 lb. sq. in. the same volume of steam weighs only 0·1,681 lb. At 50 lb. per sq. in. the weight is 0·1,227 lb. At 43·46 lb. sq. in. it is only 0·1,076 lb., and at 15 lb. sq. in. only 0·388 lb. In other words, as the pressure is reduced, the volume of a given weight of steam increases, and this increase becomes very great as the pressure becomes small. Hence as the steam passes along the nozzle or short discharge pipe it expands as it approaches the lower pressure, and if this lower pressure is less than 58 per cent. of the initial pressure, the expansion has become so great that the steam, so to speak, gets in its own way in its anxiety to get out, and the old adage, slightly modified, holds good, ' the more haste the less *quantity*.'

" De St. Venaut and Wantsel showed in 1839 by purely mathematical reasoning that the weight of compressed air discharged from a nozzle became a maximum when the external pressure was a little more than half the internal, and the result was confirmed by experiment."—*Engineering*, Sept. 1, 1922, p. 269.

The law applies also to liquids, *e.g.*, for a maximum discharge of water the head must not be greater than 70 miles !

That of all substances water has the greatest specific heat

The specific heat of water at a temperature of 15° C. is taken as unity, and the specific heats of all other substances are given in terms of this unit.

Thus while the specific heat of water is 1, that of gold is only ·032 and of silver ·057 ; but of lithium it is nearly as much as water, viz., 0·94. Of aluminium it is 0·20, and for most elements the product of the atomic weight multiplied

by the specific heat is nearly constant and equal to about 6·3. This fact was discovered in 1819 by two French chemists, Dulong and Petit.

In the case of water and liquid and solid substances, the increase in volume for a small rise of temperature is very small, but this is not so in the case of gases; hence in their cases the specific heat has to be determined for two conditions, (1) when the *volume* of the mass of gas is kept constant, and (2) when the *pressure* of the gas is kept constant. In these circumstances it is found that the specific heat of hydrogen at constant pressure is 3·24, and at constant volume it is 2·3. This means that if 10 grams of hydrogen be taken and heated, while keeping its pressure constant, it would take $3\frac{1}{4}$ times as much heat to raise its temperature 1° C. as it would to raise 10 grams of water 1° C.

That ocean waves are sometimes mountains high

Virgil in Book 1. of his Æneid (between lines 81 and 123) has given expression to this idea in describing the storm which his fleet encountered, but for him no doubt poetic licence will be claimed. [' Poetic licence ' is a most ingenious invention, no doubt made by the poets themselves as a shield to ward off attacks on all forms of their ignorance, and enabling them to write without the trouble of verifying any of their statements !]

The theory and practice of waves is an immense subject which we do not propose to summarise here, but will content ourselves by saying that the maximum height from crest to trough of an Atlantic wave which has been suitably measured and recorded is 42 ft., and bearing in mind the mass and velocity of such a wave, and the incompressibility of water, this is a sufficiently formidable fact to need no assistance from poetic licence.

Vide p. 25 of John Timbs' *Things Not Generally Known* (First Series, 1860), and a full article in *Ency. Brit.*

That mud or other matter flies off radially from a rotating wheel

There is a number of fallacies connected with rotation as will be seen herein, and the present one is a very common one, though possibly the word ' radially ' might not be used, but the meaning is the same. That is, it is thought

when mud flies off from such a wheel that it does so in straight lines radiating from the centre of the wheel. It is a natural first thought, for if a small weight be tied to the end of a piece of string and then be swung round in a circle (preferably in a horizontal plane) the string becomes taut, so that it appears as if the weight were trying to move off in a direction in line with the string, whereas, as a fact, it is trying to continue to move in a straight line *at right angles to* the string !

Consider a piece of mud on the rim of a rotating wheel. At any instant this piece of mud is moving with the rim, which is at right angles to the spokes, and a moving body always tries to move in a straight line. This line in this case would be one touching the rim at one point only, viz., at the place of the piece of mud. Such a line is said to be a tangent to the wheel rim, and the moment the mud got free from the rim it would continue to move along such a tangent : *i.e.*, it would fly off tangentially and not radially.

That artificial flight would have been accomplished long before it was if engines light enough to drive aeroplanes had been available

" When Wilbur and Orville Wright commenced their experiments in artificial flight, the only exact experiments they could find as to the resistance of the air to machines driven at different velocities were those made by the man of science, the late Dr. S. P. Langley, secretary of the Smithsonian Institution. They were the pioneers of sustained flight with aeroplanes, and they have acknowledged that their confidence in the practical solution of the problem was derived from Langley and his work. They said :—

" ' The knowledge that the head of the most prominent scientific institution of America believed in the possibility of human flight was one of the influences that led us to undertake the preliminary investigations that preceded our active work. He recommended to us the books which enabled us to form sane ideas at the outset. It was a helping hand at a critical time, and we shall always be grateful.'

" It is constantly stated that artificial flight would have been accomplished long before if engines light enough to drive aeroplanes had been available, but that is not the case. Flights with two, three or more passengers show that lightness of the motor is not the only consideration, and motors with equivalent weights were available ten years before the

Wrights designed their man-carrying aeroplanes. It was by following the scientific guidance of Langley, and using mechanical ingenuity to extend it, that they were able to give practical effect to the desire of man to rise above the clouds."—Sir Richard Gregory, D.Sc., F.R.A.S., at p. 206, *The Illuminating Engineer*, May, 1915.

That there are such things as aerial torpedoes

The marine torpedo was designed for a specific purpose and it fulfils that purpose only too well. It enables a small quick-moving torpedo boat to keep well away from the object it wishes to attack, for a torpedo contains a large proportion of elaborate and beautifully made machinery, driven by compressed air (which is carried in the torpedo), which rotates its small metal propeller and drives it ahead. It is in fact much like a small submarine in principle, to which is attached in front a chamber containing a high explosive and a percussive fuse. Hence the torpedo-boat can keep comparatively out of the way and start the torpedo on its course to hit an object a considerable *horizontal* distance away. Now the alleged aerial torpedoes are dropped (or *were* dropped, for I am now writing since the air raids on England, and London in particular, ceased) from Zeppelins or aeroplanes both of which are fully capable of travelling horizontally more or less where they please, while still being comparatively safe from the danger of gun fire from the ground on account of the height and speed at which they travel. Allowance is made by the bomber for the height and the rate at which his aircraft is travelling, and by merely dropping an inert bomb, having no propelling or other mechanism except the fuse, he is able to hit his object fairly well, or at least quite as well, and probably better, than if the bomb had propelling mechanism in it so as to justify its being called an aerial torpedo. At the tail of some bombs there are certain metal vanes or feathers for keeping it steady in the same manner that an arrow is kept steady, but this addition has no propelling action, or even directing effect, except to keep its axis tangential to its path from the aircraft to the earth. There is also no aerial equivalent of the marine torpedo in the sense that one airship could discharge such a piece of apparatus at another airship at about the same height as itself, and a considerable horizontal distance from it.

That the æther is an exceedingly light substance

"We know that the energy of an electric current is really in the æther, *i.e.*, in the magnetic field surrounding the current; but we must admit that the electromagnetic explanation of inertia is no ultimate explanation; it is but relegating the property to some fundamental property of the æther, of which substance presumably matter itself may in some way be composed.

"Evidence suggests that the æther is an excessively dense substance, and that it circulates slowly along lines of magnetic force. But though so dense we have no means of apprehending it directly."—Sir Oliver Lodge, F.R.S., *Nature*, Sept. 25, 1919, p. 87.

That a test for amber is to rub it on a coat sleeve, and if it really is amber it will then pick up small particles of pith, paper, etc.

The rubbing produces a charge of electricity on the amber, and hence the attraction of the small particles, but rubbed glass, vulcanite, ebonite, shellac, etc., will do the same.

The word 'electricity' is derived from Gr. *ēlektron*, amber, and this is probably how the mistake has arisen.

That the conclusions arrived at by men of science are of the nature of beliefs

"There is a common impression that the conclusions arrived at by men of science are of the nature of beliefs, and have, therefore, no firmer basis than that of conviction. Nothing could be farther from the truth. From his earliest days the student of science is trained to ask for evidence before arriving at a judgment; and he should hesitate to pass an opinion upon a subject with which he is not familiar."—Sir Richard Gregory, D.Sc., F.R.A.S., in *Discovery*, p. 92.

That a fine black object can be seen best against a white background

When the author visited the electric bulb lamp works of MM. Edison & Swann in June, 1915, and those of the General Electric Co. in 1922, he saw the girls deftly handling fine black metal filaments in trays which were covered with black velvet, and we may be sure this would not have been the

case unless it was advantageous, for the girls were working at piece-rates and the firms would only pass a good article.

The reason is that if the background is white the quantity of light reflected from it into the eye is comparatively so great that it causes the pupil of the eye to close, and the glare makes it difficult to see so small an object as a metal filament. But with a black background there is no glare, the pupil becomes larger, the object is seen more easily, and the eyes are not tired so soon.

That a bullet on leaving a gun goes in a straight line for some distance

" Before his [Tartaglia's—1537] time it had been generally believed that a ball on leaving the bore of a gun proceeded for some distance in a straight path—a fallacy which lurks in the phrase ' point-blank,' not yet expunged from popular speech. He saw, however, that ' a piece of artillery cannot shoot one pace in a right line,' and propounded the axiom that ' the more swifter a pellet doth flie, the lesse crooked is his range'—a truth expressed at the present day by the statement that a high velocity gives a flat trajectory."—*Ency. Brit.* XI., 297.

That the method, known as Cardan's, of solving cubic equations was invented by Cardan

" Nicolo Tartaglia, an ingenious calculator, had discovered an important improvement in the method of cubic equations. This discovery Tartaglia had kept to himself, but he was ultimately induced to communicate it to Cardan under a solemn promise that it should never be divulged. Cardan observed this promise in publishing his arithmetic, but when, several years afterwards, the isolated rule of Tartaglia had developed itself in his mind into a principle capable of transforming algebraical science, he thought himself justified in disclosing it as the groundwork of his own comprehensive treatise on algebra, which appeared at Nuremberg in 1545. This memorable volume marks an era in the history of mathematics, being the first in which the principle of cubic equations was fully explained, and the first example of the application of algebraical reasoning to geometrical problems. Its publication naturally involved Cardan in a violent controversy with Tartaglia, and it must be admitted that his conduct

cannot be strictly justified, notwithstanding his ample acknowledgment of his obligations to his original instructor." —*Ency. Brit.*, V., 90.

That a cubic foot of large lump coal weighs less than a cubic foot of small lump coal

This fallacy does not depend on the volume selected, so long as the volume is the same in both cases. Nor, of course, is the problem confined to coal; any material will do, but the lumps are assumed to be roughly spheres in both cases, and that all the large lumps are of one size and all the small ones of another size.

The idea has arisen from the fact that in the case of the large lumps the individual air spaces between the lumps are undoubtedly larger, but it is overlooked that there are far more voids in the case of the smaller lumps, although each void is smaller.

The proof is as follows :—

Let n be the number of spheres in one foot length, then the total number of spheres in the cubic foot is n^3, and the radius of each sphere is $\frac{1}{2}n$ ft.

The volume of a sphere is $\frac{4}{3}\pi r^3$.

$\therefore$ the volume of one of these spheres is

$$\tfrac{4}{3}\pi\ (\tfrac{1}{2}n)^3 = \tfrac{1}{6}\pi\ \tfrac{1}{n^3}\text{ c.ft.}$$

and as there are n^3 spheres, the total volume of the spheres (coal) in one cubic foot is $\frac{\pi}{6}$ cubic foot. That is, slightly more than half is coal and slightly less than half is air space, and as the total volume of coal in a cubic foot of space is represented by $\frac{\pi}{6}$, which does not include the symbols n or r, it is seen that the volume of coal is independent of the size of the lumps. This fact enables graded coal to be measured instead of weighed, and some automatic and continuous coal weighing apparatus make use of this principle.

That a high percentage of CO_2 in the flue gases from a steam boiler necessarily means a high boiler efficiency

"8. *Carbon Dioxide* (CO_2).—Mr. Bennis (page 326) seemed to be under the delusion that higher CO_2 necessarily meant higher efficiency, which did not follow at all. A given plant might have 14 per cent. CO_2, and be giving far worse

results than one with 5 per cent., and the author once met a very careful engineer who had proved (quite correctly) to his own satisfaction that as the percentage of CO_2 increased on the boiler plant, his efficiency gradually went down. Consequently, he had thrown out his CO_2 recorder, and regarded all such instruments as frauds. The reason was that in addition to high CO_2 there must be a high furnace temperature and no free CO (carbon monoxide). With a black fire, bad draught, and 14 per cent. CO_2, a plant might easily be giving bad results for this reason. If free CO escaped unburnt the heat loss was serious, as 1 lb. of carbon in burning to CO only gave 4,450 B.Th.U., but if burnt to CO_2 gave 14,500. The results were that mechanical stoking was giving slightly more CO_2 (8·25 per cent. against 7·5 per cent.), but the efficiency could quite easily be very much less than hand-firing if more CO were present, and the author could assure Mr. Bennis that there was nothing wrong with the figures."

David Brownlie, B.Sc., F.I.C., writing in reply to the discussion of his paper, *Trans. Inst. Mech. Engs.*, Jan.-Apr., 1920, p. 406.

That Collieries burn chiefly refuse and unsaleable coal

Articles appeared in *Engineering* of July 25 and August 1, 1919, based on the results obtained by testing 100 boiler plants, chiefly of the Lancashire type.

The author of the articles directs attention to the Final Report of the Coal Conservation Company, which states that " the policy of collieries has been to set free the best qualities of coal for the market and to retain for colliery consumption the poorest quality. The returns show that the quality of ash in some of the fuels used ranges from 50 per cent. to 80 per cent.," but the results of the 100 trials show an average of only 15·5 per cent. of ash, and that the coal used by those colliery boilers had an average calorific value of 10,500 B.T.U. per lb. In actual fact, 52 per cent. of the coal used at collieries is high-grade. 32 per cent. of the remainder could be used for steam generation, and only 16 per cent. is definitely unsaleable. The highest ash-content of this refuse coal is recorded to have been only 35 per cent., and the article states that the idea that collieries burn chiefly refuse and unsaleable coal is a complete fallacy. The present author, also as the result of tests of colliery

boilers and knowledge of their firing, can generally confirm the above statements.

That a Column free at one end and fixed at the other is stronger than one which is rounded or hinged at both ends

It is certainly a very unexpected result to find that the former is only *one-quarter* as strong as the latter! This is demonstrated at pp. 165 and 166 of *Applied Mechanics* (Fifth Impression, 1920), by Prof. D. A. Low, Wh.Sc., M.I.Mech.E.

Euler's theory of long columns shows that a column of length L, hinged or rounded at both ends, can support a maximum load P given by the relation

$$P = \frac{\pi^2 EI}{L^2} \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (1)$$

Where E is the modulus of elasticity of the material of the column and I is the moment of inertia of the cross section of the column. When so loaded, the column is slightly bowed, and at the middle of its height (for a short length) it is vertical. Hence as far as its upper half is concerned it may be considered as clamped in a powerful vice at its middle. We then have the case of a column of length $\frac{L}{2}$ fixed at its bottom end, free at the top, and loaded there with P. Thus we see at once that for *equal* strength the column fixed at the bottom and free at the top can be only *half* the height of a column hinged at both ends. But we wish to compare the case in which both columns are the *same* length L, and if we double the length of the portion above the vice, so that its length is then L, we must write 2L for L in Euler's equation (1) above, as L in that equation refers to the length of the whole bowed column between its two hinged ends.

$$\text{Thus } P = \frac{\pi^2 EI}{(2L)^2} = \frac{\pi^2 EI}{4L^2}$$

in the case of a column of length L free at the top and fixed at the bottom.

That is it is capable of sustaining only *one-quarter* the load which it could if it were hinged at both ends.

That metallic copper is poisonous

Mr. Ockenden, an old member of the 'Zoo' staff, was stated in the *Daily Mail* of Feb. 1, 1922, to have said, "We

find quite a number of coppers inside the birds (ostriches). The coins are often worn so thin that you cannot see the date.''

The evening press of May 25, 1922, reported the case of a child of 12 who, 8 or 9 years, previously, had swallowed a half-penny. On being taken to St. John's Hospital, Lewisham, Dr. Harrison recovered the halfpenny which had become very thin. " Dr. Ofenheim, the well known bacteriologist, who resides at Blackheath, attributes the child's recovery to the fact that the coin was copper. ' Copper has a strong bactericidal action,' he said. ' If it had not been a copper coin the child would have died from septic poisoning long ago.' "

That the Dome of St. Paul's Cathedral is a simple and self-supporting one

There are inner and outer domes and between them is the structure which supports both, namely a cone with a wrought iron chain round its base. A true dome is self-supporting, and the inside is as large as the outside except for the effect of the thickness of the material of which the dome is constructed.

That Einstein has completely upset Newton's laws of gravity

" An interesting interview with Prof. Einstein appeared in the *Daily Chronicle* of January 15. A German by birth, Prof. Einstein went to Switzerland in his early youth, where he became naturalized. For some years he was professor of physics at the Federal Polytechnikum in Zürich, and for a short time also at the University of Prague. Shortly before the outbreak of war he was ' called ' to the University of Berlin, where he is still working, being at the same time director of the Kaiser Wilhelm Institute for Physical Research. Now little more than forty years of age, this eminent man of science conceived the outlines of the theory of relativity at the early age of eighteen, and presented his special theory to the scientific world at the age of twenty-seven. Prof. Einstein regards Prof. Lorentz (Leyden) as his ' co-operator' in the special theory of relativity. He points out that, far from vitiating the results of Newton, the theory of relativity rather enhances the greatness of this genius. Though these new ideas will not overthrow the general conceptions of mankind, they will leave their impress on men's thinking

in the philosophical and allied sciences."—*Nature*, Jan. 22, 1920, p. 541.

That the limit given by Euler's formula for struts implies failure of the strut

In a review by 'L. N. G. F.' of *A Treatise on the Mathematical Theory of Elasticity*, by Prof. A. E. H. Love, in *Nature*, of June 24, 1920, it is said, "It might be useful, in dealing with buckling, to dispose of a fallacy common among engineers that Euler's limit implies *failure* of the strut, whereas all that occurs is passage from one type of stable equilibrium to another."

Vide *Strength and Design of Compression Members*, by Dr. E. H. Salmon, D.Sc. (Engineering).

That the equation $\frac{y}{m} = aC^{\frac{1}{n}}$ is an exponential one

In the above equation :—

m is the quantity of adsorbent.
y is the quantity adsorbed.
C the equilibrium concentration in the liquid after adsorption.
a is a constant.
n is a constant.

"It may be pointed out here that the formula is very frequently, but quite erroneously, spoken of as an 'exponential' one. An exponential expression is one containing one of the variables—in the present case these are y and C—as an exponent, whereas the exponent in the equation of the adsorption isotherm is a constant."—Emil Hatschek, p. 85, *An Introduction to the Physics and Chemistry of Colloids* (1919).

That hand-work is always better than machine work

The converse would be nearer the truth, especially if interchangeability is important. Hand-made ball-bearings for motor cars and bicycles are unthinkable!

"Until comparatively recent years tyres were built by hand, and it was at one time thought that the human element was essential to success. That contention, however, has been completely disproved, and modern machinery—under supervision of course—makes the best pneumatic tyres. The great weakness of tyre construction by hand, curiously

enough, is the human element held in such veneration in days gone by."—J. C. Furguson on *The Motor Car Pneumatic Tyre*, Soc. of Engineers, April 4, 1921, p. 7.

Mr. Furguson also said, " It is a common mistake among motorists to imagine that a tyre bearing the mark of cloth wrapping is a re-treaded tyre."

That if a truss of hay, weighing, say, 20 lb. be picked up on a pitch-fork, and carried on a man's shoulder, the pressure on his shoulder is only 20 lb.

This would be true if the hay itself could rest directly on the man's shoulder, but if it be carried with the fork nearly horizontal, then the pressure on the shoulder is considerably greater for the principle of the lever is involved, the shoulder being the fulcrum, the force on which is equal to the sum of the weight of the hay plus the downward pressure of the man's hands on the handle of the fork.

That if the piston of an engine be formed with a series of concentric corrugations on its two working faces, the effective pressure on it will be increased

The pity is it is not true ! The only useful pressure on a piston, whether flat, coned, or corrugated, is that which acts parallel to the reciprocating motion of the piston. Part of the pressure on the corrugations would have components acting radially inwards towards the centre of the piston, and part radially outwards, but being at right angles to the direction of motion they would be useless from a power point of view.

That a free plane in a stream of fluid sets itself parallel to the stream

It is natural to think this, because it is expected that the plane will so dispose itself as to offer the least resistance to the stream, but as a fact the plane is not in the least anxious to afford facilities to the passage of the stream ; on the contrary it does its best to oppose the stream by presenting its broadside, not its edge, to the stream. It is said that when boats drift down a river they do so sideways, though the case is not analogous, for the free plane is not supposed to be floating down stream, but to be pivoted in some way.

That high tensile steel is the strongest material for its weight

If a long piece of material of uniform cross section be suspended vertically from its top end, there will be a maximum tensile stress at that end due to the weight of the bar, and by making the bar long enough its weight will be sufficient to break the bar. Such a length is called the strength-length of the material.

Material.	Strength-length in metres.
High tensile steel	20,000
Pain's (hemp) Light Rocket cord...	28,000
Aluminium	64,000

That the readings of an ordinary thermometer placed in the Sun's rays have any very definite meaning

Different, though accurate thermometers, on being placed in sunshine, give different readings, but these same thermometers on being placed in the shade would all give the same reading. A thermometer in the shade gives the true temperature of the air which surrounds it. The steady reading of a thermometer placed in sunshine merely records the temperature at which it is losing heat as fast as it is receiving it, and this depends on the design of the thermometer. If it received more heat than it lost its temperature would rise, and we have supposed the steady reading to have been attained. Similarly, if it lost more heat than it received, its temperature would fall. By screening the thermometer, so as to prevent loss of heat by conduction, and allowing the Sun's rays to fall on it, but *without concentrating* the Sun's rays upon it, I have recorded a temperature of 250° F. (*i.e.*, above the temperature of boiling water), though the temperature recorded by a similar thermometer suspended in free air in the sunlight was only 85° F. In like circumstances steam was produced and used to develop many horse-power.

The *quantity of heat* received per square centimetre per minute from the Sun *is* a definite amount, and is known as the Solar Constant. It is 1·93 calories per sq. cm. per min.

That a theory may be true even though it does not conform with facts

The theory of a subject is the system of co-ordinated experimental facts which is accepted by the leaders in the

branch of knowledge concerned. An hypothesis is (or may be) a theory in embryo set up by one or two research workers in an attempt to account for certain experimental results obtained. If further experimental work, especially by others, confirms the hypothesis it is accepted and then becomes the acknowledged theory, but it certainly would never be adopted unless it conformed with facts. The theory of a subject helps us to understand the reasons for certain phenomena, and enables us to arrive at other results which it might be very difficult to achieve experimentally.

That instants in our Consciousness are world-wide

" I venture to differ and to suggest that (subject to certain reservations) time as now understood *was* discovered by an astronomer—Römer. By our sense of vision it appears to us that we are present at events far distant from us, so that they seem to occur in instants of which we are immediately conscious. Römer's discovery of the finite velocity of light has forced us to abandon this view ; we still like to think of *world-wide* instants, but the location of distant events among them is a matter of hypothetical calculation, not of perception. Since Römer, time has become a mathematical construction devised to give the least disturbance to the old illusion that the instants in our consciousness are world-wide.' —Prof. A. S. Eddington, F.R.S., *Nature*, Feb. 17, 1921, p. 803.

That if the air pressure in the tyre of a motor car is, say, 80 lb. per square inch, and then the car is loaded with, say, a ton, the air pressure in the tyre is materially increased

The loading of the car causes a larger portion of each tyre to come in contact with the ground, and for this to occur the tyre is compressed slightly where it is in contact with the road. This compression produces a small percentage decrease in the volume of the air in the tyre ; this *slightly* increases the pressure in the tyre, which in turn slightly expands the tyre where it is not in contact with the road, thus slightly reducing what otherwise would have been the little increase of presssure. The net result is therefore inappreciable.

That the tensile strength of water is practically nil

" Liquids perfectly free from air can sustain considerable tension without rupture, *e.g.*, water can withstand a tension of

5 atmospheres, alcohol 12, and strong sulphuric acid 12 atmospheres."—Dr. G. W. C. Kaye, D.Sc., and T. H. Laby, B.A., p. 39, *Physical and Chemical Constants* (1911). 5 atmospheres = 75 lb. sq. in.

Authorities differ somewhat, for elsewhere we find " The tensile strength [of water] = its intrinsic pressure = 11,000 atmospheres " ! Let teetotallers be warned against this ' strong drink ' !

That the enlargements (weights) on the rims of the driving wheels of locomotives are for the purpose of getting the cranks past the dead-centres

There is no difficulty in getting cranks past the dead-centres when there are two or more double-acting cylinders. The problem does occur in the case of a single-cylindered engine, but the fly-wheel, which is necessary for equalising the energy of each stroke to the work to be done, also carries the crank past its dead-centres. The rims of the driving wheels of locomotives act as fly-wheels, so for a second reason there is no need for any further device as far as the dead-centres are concerned. The weights on the rims are to balance the weights of the cranks and coupling rods.

That in passing separately through a lock a 15,000 ton liner uses less of the canal water than a 150 ton tug

Suppose the difference in level of the water up and down stream is 12 feet, and that coming up stream the lower gates are open when the liner arrives at the lock. In entering the lock she displaces her weight of water, but she does *not* alter the level of the water in the lock. The lower gates are then closed, the up-stream sluices are opened, and the water level in the lock is raised 12 feet. Suppose the lock is 500 ft. long by 100 ft. wide, then $500 \times 100 \times 12 = 600{,}000$ cubic feet of water have been admitted. The up-stream gates are then opened, and as the liner passes out an amount of water equal to her displacement passes in, but there is no change in level of the water in the lock, and the only quantity of water that has been *used* is 600,000 cu. ft. Now, suppose the same series of operations with the tug. When it enters through the lower gates it displaces less water, but the level of the water in the lock is the same as before, and when the lower gates are closed and the upper sluices closed, the water level in the lock has again to be raised 12 ft., and therefore again 600,000 cu. ft. of

water have to be admitted! There may be a difficulty in thinking that the quantity is affected by the presence of the ship when the level has to be raised 12 ft., but if a horizontal plane at the bottom of the keel is considered, where the horizontal area of the lock is not affected by the liner, then it will be seen that the keel floats up 12 ft., and therefore 12 × 500 × 100 cu. ft. of 'solid' water must be admitted.

In going down stream the result is the same. Suppose the upper gates open, the liner passes in and as she does so water passes out, but the level is not altered, and when she is in the lock her keel is, say, 35 ft. below the surface of the water. The upper gates are then closed and the lower sluices opened so as to lower the water (and the keel) 12 feet; hence 600,000 cu. ft. of water have been used as before. Obviously, the keel must be lowered 12 ft. or the vessel would have a different draught up stream to down stream! Similarly, if the tug enter by the upper gates, her keel must be lowered the 12 feet in the lock, and hence again only the 600,000 cu. ft. of water are used.

Some suggested Additions

The author read a paper on "Technical Popular Fallacies" before the Civil and Mechanical Engineers' Society, on Nov. 4, 1909, being the last paper read before that Society (established 1859) previous to its joining forces with the Society of Engineers in Feb., 1910. In the discussion which followed Mr. E. Fiander Etchells, A.M.I.C.E., caused much amusement by submitting the following additions:—

(1) That the lowest tender is always the cheapest.

(2) That specifications mean exactly what they say.

(3) That three coats of paint can be applied in one operation by laying it on thick enough.

(4) That the contractor will not make any charge for the 'extras' on that last contract.

(5) That reinforced concrete is not governed by the ordinary laws of mechanics.

(6) That engineering can be learned in less than a lifetime.

(7) That engineers are grossly overpaid.

FALLACIES CONNECTED WITH STATISTICS AND NUMBERS

That the Square Root of a Fraction is less than the Fraction itself

We usually deal with the square roots of integers, or whole numbers, saying, "The square root of 64 is 8," and so on, in which case the root *is* less than the number; but the square root of $\frac{1}{9}$ is $\frac{1}{3}$, for $\frac{1}{3} \times \frac{1}{3} = \frac{1}{9}$, and $\frac{1}{3}$ is *greater* than $\frac{1}{9}$. Or we have in decimal fractions: the square root of 0·25 is 0·5, and 0·5 is *greater* than 0·25.

That there are Three (some say Seven !) Women to every Man in England

This is a most curious fallacy, and one which some of us poor men, who are not particularly handsome or charming, regret is a fallacy! There *are* more women than men in England, as the following tables (from *The Stateman's Year Books*) show :—

Year 1896.	Males.	Females.	Ratio of Females to Males.
England ...	13,291,402	14,192,088	1·068
Wales	761,499	757,536	0·995
Scotland ...	1,942,717	2,082,930	1·072
London ...	1,999,435	2,232,683	1·117

From this we see that London is the most favoured! In 1901 the ratios were practically the same, and in 1921 the figures were :—

Year 1921.	Males.	Females.	Ratio of Females to Males.
England ...	16,984,087	18,694,443	1·100
Wales	1,098,133	1,108,579	1·007
Scotland ...	2,348,403	2,533,885	1·080

For the three countries, the excess of women in 1896 was 1,036,936, and in 1921 the excess was 1,906,284, or an increase

of nearly a million, which corresponds closely with the loss in the war of practically the same number of males chosen for their physical fitness, or who went of their own accord on account of their moral, as well as physical, fitness.

Strangely enough, though there are more women than men alive, more males are born than females, the numbers for England in 1894 being 453,016 males and 437,273 females, *i.e.*, for every 1,036 males born there are only 1,000 females born. The infant mortality of males is greater than that of females, and men, owing to their vocations, are more exposed to trying conditions and accidents than women, hence their number is reduced to below that of women.

In 1894 256,015 males died, *i.e.*, 17·6 per 1,000 of living males ; but only 242,812 females died, *i.e.*, 15·7 per 1,000 of living females.

During the ten years 1884 to 1893, inclusive, out of equal numbers living there were 1,122 deaths of males to 1,000 deaths of females.

The Blue-book issued on July 25, 1912, showed that there were 1,179,276 more females than males in England and Wales, in a total population of 36,070,492 persons.

These facts have been used to show the superiority of women by the doctrine of the " survival of the fittest " ! Now that women are entering so many walks in life which in former years were monopolised by men, they are more exposed than they used to be, and hence we may expect the excess of women to be reduced or removed altogether. Another factor causing the excess of women in England is that the majority of emigrants are males, and consequently in the Colonies (*e.g.*, in Australia and the Cape) the men are slightly in excess. Lastly, girls are taking much more exercise now (by going in for cycling, boating, tennis, golf, hockey, etc.) ; tight-lacing is most fortunately a thing of the past, and these factors aid in maintaining an excess of women, but then we cannot have too much of a good thing. The fallacy may have arisen by someone noticing the proportion of men to women outside Peter Robinson's or Selfridge's when there was a sale on !

That a Warm, or Green, Christmas makes a Fat Churchyard

" Death has no better ally than a ' good old-fashioned winter,' in spite of ancient saws and sayings to the contrary. As the thermometer falls the death-rate rises, and so it is

happening now. The present winter has no claim to historical rank as yet, however keenly we may feel it at the moment, but the frost has lasted three weeks, and its effects are visible in the Registrar-General's Returns and the records of the Coroner's Court. Up to the commencement of the present spell of cold weather the death-rate had been remarkably low for many months, both in London and the country generally. According to a Return just published, the rate for the last quarter of 1894 was the lowest ever recorded for that period of the year, being only 16·4 per 1,000, whereas the average for the previous ten years was 19·0 per 1,000. London fully shared the general healthiness, until the colder and rougher days of January set in. After a period of fluctuating and unsettled weather, continuous frost began about the 25th of last month, and since then the death-rate has steadily risen from 17·6 in the first week to 19·0 in the second, and 21·0 in the third. Considering the severity of the cold, it is surprising that the rise has been no greater. During the last notable frost, which occurred in the winter of 1890-91, the Metropolitan death-rate ran up suddenly to 26·0, and then to 29·7, while in more northerly towns it repeatedly exceeded 40·0, and even 50·0, per 1,000. The explanation lies, probably, in the character of the present frost, which has, so far, been accompanied by an extraordinary amount of dry and fine weather since the first snowfalls. This, indeed, has been its most striking feature. Usually, a severe English winter brings with it a leaden sky or dense fogs. So it was in 1890-91, the daily record reading either 'overcast' or 'foggy,' with hardly any exception.

"But this year we have, until quite lately, enjoyed cloudless skies for days together. The difference may be measured by the fact that last week alone the number of hours of bright sunshine was more than double that recorded during the seven weeks of frost in 1890-91. It is not cold alone that kills, but cold accompanied by darkness and damp, and especially the icy gloom of our terrible frosty fogs. In the year 1880 a prolonged spell of such weather brought the London death-rate up to 46·7 in the first week of February. We have so far been wonderfully lucky this winter in getting off with two or three partially foggy days, and the immunity is cheaply purchased at the cost of the cutting east wind. After all, our severest cold is a mere

trifle compared with the ordinary winter temperature which occurs in many countries, and is easily borne, not merely because people are accustomed to it, but because it is accompanied by a dry atmosphere and bright sunshine. These help to counteract the physiological effect of cold in 'lowering the vitality,' whereas darkness and damp increase it. Nevertheless, such weather as we have recently had inevitably claims a large number of victims among the old, the very young, and the infirm of all ages. The chief cause is the aggravation of those affections of the chest which are at all times so great a scourge in these islands. The deaths attributed last week to this cause in London alone numbered 480, of which 40 per cent. occurred in persons over sixty years of age, and 30 per cent. in children under five." —*Standard*, Feb. 16, 1895.

"The increased amount of illness and the rapid rise in the death rate which always follow close upon the first days of wintry weather in London are strikingly demonstrated in the Registrar General's returns for the past month, which give the following figures :—

Week ending.	Death Rate.	Total Deaths.
October 23	11·5 ...	... 1,067
October 30	11·9 ...	... 1,107
November 6 ...	13·4 ...	... 1,246
November 13 ...	13·9 ...	... 1,285
November 20 ...	14·7 ...	... 1,363

The menace to health which a cold wave brings to the aged is best seen in the returns of deaths from bronchitis, which annually accounts for more deaths among old people than any other disease :

Week ending.	Deaths from Bronchitis	Deaths of people over 60.
October 23 ...	53 ...	... 19
October 30 ...	68 ...	... 32
November 6 ...	104 ...	... 40
November 13 ...	118 ...	... 66
November 20 ...	123 ...	... 68."

—*Daily Mail*, Nov. 24, 1909.

The *Quarterly Return* of the Registrar-General, dated July 31, 1919, for the year 1918, gives the following death rates for England and Wales, which clearly show the evil effects of the winter months :—

March quarter	16·4	per	1,000	living.
June ,,	13·8	,,	,,	
Sept. ,,	13·0	,,	,,	
Dec. ,,	27·0	,,	,,	

That the World was only 4,000 Years Old when the Christian Era began

" The poor World is almost six thousand years old."
As You Like It, IV., i., 87.

This idea is taken from the Bible, where, opposite the first verse of the first chapter of *Genesis*, we see the date " B.C. 4004." This and the other dates in the Old Testament were arrived at by Archbishop Ussher (*Annales Veteris et Novi Testamenti*, and *Chronologia Sacra*, 1650), and they were first added to the English Bible by Bishop Lloyd in the great edition of 1701.

We extract the following from *Helps to the Study of the Bible*. (Oxford Press, 1895):—

" The years are found by taking the age of each person in the genealogy at the birth of his eldest son. The opinions of chronologers as to the era of Creation vary, indeed, by many centuries : Ussher (in 1650), 4004 B.C. ; Hales (in 1830), 5411 ; Jewish reckoning, 3760 ; Alexandrian, 5503, etc." That we shall ever know the exact age of the world is highly improbable, but it is certain it is more than 6,000 years old at the present time. Lord Kelvin estimated it at about 26 *millions* of years, and this is one of the lowest of modern estimates !

" Prof. W. H. Pickering, in *Popular Astronomy* (Oct., 1919), endeavours to reconcile Sir George Darwin's estimate of the moon's age (less than 60,000,000 years) with recent geological opinion, which demands a period of 1,200,000,000 years since the formation of the earth's crust. He suggests that the matter of the moon left the earth at that remote epoch, but remained for ages circulating round the earth as a cloud of fragments."—*Nature*, Jan. 8, 1920.

That January 1, 1900, was the First Day of the Twentieth Century

History repeats itself. About the year 1800 people used to be puzzled to know whether such and such a day or month belonged to the eighteenth or nineteenth century, and now if it be asked whether January 1, 1900, was in the nineteenth

century or the twentieth, most people will reply wrongly, and it is somewhat difficult to show them where the mistake lies. The first century began with January 1, 1, that is, we write the number of the year before we have had the whole year; thus we wrote January 1, 1896, before we had had even two days of the 1896th year. On December 31, 99, there had been 99 years of the first century, and the *whole* of the year 100, from January 1, 100, to December 31, 100, must be added to complete the first century. Similarly, on December 31, 1899, we had had 99 years of the nineteenth century, and we had to have one whole year more to complete the nineteenth century, *i.e.*, January 1, 1900, to December 31, 1900, belonged to the nineteenth century, and January 1, 1901, was the first day of the twentieth century.

That Four Feet Square and Four Square Feet are the same Quantity

This sounds rather like the difference between Tweedledum and Tweedledee!

A table-top which is four feet square measures four feet along each edge, and its area is *sixteen* square feet; but a table-top of four square feet measures only two feet along each edge, and is only one-fourth the area of the first table.

This is somewhat akin to the question, "What is the difference between six dozen dozen and half a dozen dozen?" Think it out!

A paragraph appeared in the *Daily Mail* of Aug. 16, 1923, headed "Richest 100 sq. Yards," and proceeded to compare the value of the gold on the site of the U.S. Assay office with that at the Bank of England. Obviously 100 yards square was meant, as 100 sq. yards would be only 10 yards square.

That Statistics can prove Anything

A more popular catch-phrase than this among those who are unaccustomed to dealing with figures it would be difficult to find. There are few arguments in which it is not necessary to bring forward statistics of some sort, but directly this is done these unsatisfactory people quote the above statement with an air of infallibility and finality that is perfectly marvellous.

Of course, we assume that the figures *are* statistics, that is, a collection of *facts*, and that they are not 'cooked,' 'fudged,' or in any other way the product of some unscrupu-

lous individual. This being so, it is absolutely ridiculous to suppose that by submitting these figures to any mathematical process we can alter the *facts*, though we may be able to state the facts in figures in such a way as to be misleading, especially to those not conversant with statistics, *e.g.*, suppose that in some very little village there are only four children, and that two of these have measles. We can truly say that 50 per cent. of the children in such-and-such a village are down with measles, but the statement would be misleading to anyone who did not know the number of children in the village. Again, suppose another very small village with five children, and that all these have scarlet fever ; this fact would then not *appear* so serious to one who was told that five children had scarlet fever, and who did not know the total number of children in that village, and who consequently would not realise that all the children who could take scarlet fever had done so.

Some years ago there was an increase in the number of cases of cancer, and at the same time there happened to be a fine crop of tomatoes, which were eaten.* Then some illogical individual stated that the eating of tomatoes produced cancer, and gave figures to ' prove it,' as he said. Now, how *could* the figures *prove* what was not a fact ? Clearly, if anyone allows himself to be misled in that way, it is only his own short-sightedness and ignorance that he has to blame, and *not* the statistics—*facts*, which cannot lie. Is it likely that men of such standing as are many of the Fellows of the Royal Statistical Society would give their time and money to dealing with statistics if they could be made to prove anything ?

We *must* have statistics—of the birth-rate, marriage-rate, death-rate, cases of various diseases, accidents, water-supply, milk-supply, bread-supply, production of iron, steel, and other metals, the numbers of men (and women) employed in different professions and trades, the number of passengers per train-mile and per tract-mile, etc. ; imports, exports, things made in Germany, etc.—and most useful they are, and very interesting they can be made, as the perusal of the articles on the census in the *Strand Magazine*, and in the *Daily Graphic* of September 2 and 4, 1893, will prove.

* There was nothing to show that the cancer patients had eaten more than their share of the tomatoes ; and, even if they had, the case against tomatoes would by no means have been proved.

"The English Race.

"It is a common sneer of the ignorant and unthinking that figures may be made to prove anything, and that statistics are consequently useless and misleading. Sir Robert Giffen, in his presidential address to the Economic Science Section of the British Association yesterday, effectually proved the falsity of the taunt. He took as his subject 'The utility of common statistics,' and handled it in his customary lucid and interesting manner. It is a subject on which he is peculiarly well qualified to speak, as there is no Englishman living who knows better how to turn ordinary statistics to account and to reach their true significance."—*Globe*, Sept. 13, 1901.

Correlation and the subject of statistics in general have been greatly developed during the last 20 years by Prof. Karl Pearson, F.R.S., Mr. Udny Yule, Mr. and Miss Elderton, and others. There is *far* more in it than at first meets the eye!

That most Deaths occur between the Hours of Two and Six in the Morning

Dr. Charles Féré some years ago tabulated the death hours of all patients dying in two Parisian hospitals during a period of ten years, and he found that there were rather fewer deaths between seven and eleven o'clock in the evening than at any other time, but that *there was no special preponderance at any hour*. This experience agrees with that of the medical man referred to in the article which appeared in *Pearson's Weekly* of August 8, 1896, and of which we reproduce the last paragraph:—

"From these 15,000 cases, extending over a period of twelve years, it would appear that death occurs seemingly without any particular predilection for any certain hour, and that the number of deaths for each hour is very evenly proportioned, considering the large number of cases taken and the time covered."

That if you toss a Coin, say, Ten Times, and each Time it comes "Heads," then the next Toss is more likely to result in a "Tail" than in a "Head"

This fallacy—known as the 'resolution of the odds'—probably arises from an incorrect combining of one chance with another. We know that under certain given conditions

we can correctly calculate the chance of a certain event happening. Suppose that on doing so the chance is one in nineteen. By this is meant that if we repeat the conditions an *indefinite* number of times, then *on the average* the particular event will occur once in every nineteen cases. This is entirely different from expecting that it *must* occur once if we repeat the conditions nineteen times, but thinking this (as is common) we naturally expect, as we get towards the end of the set of nineteen, that each succeeding experiment is more likely than the last to give the particular case. In the case of a coin it is bound each time to fall either a head or a tail. Therefore in the case of *each throw* the chance of its falling a head is one in two, no matter how often it has come a tail before.

For much that is interesting on this subject, see *Choice and Chance*, 1870, by William Allen Whitworth, M.A.

" The average man must regard it as contrary to common sense, if not actually impious, and I doubt if there is anything in the book that will shed more real enlightenment. I sometimes put the argument thus: If I toss this coin, you will agree that the chances of its falling head or tail are equal? Has the coin itself any knowledge of past or future, and, if so, has the coin any power to influence the way in which it is going to fall? Can anything that *I* have done in my past life, or that *I* am going to do in the future, affect the result of the toss? Then, if the result of this (as of any other) toss is an equal chance, and is unaffected by what has gone, or what is to come, or wilfulness on the coin's part, how can the fact that I have already thrown heads 9 times in succession affect the chances of this, the 10th, throw? And series of heads or tails, 10, 13, 19, 29, 35 times in succession, occur with perfect regularity that can be foretold in so many million tosses, and are just as rigidly controlled by the law of averages as are the ' one in two ' of the single toss."—

Donald Gunn.

That in the case of a number of numerical results, the average percentage is the same as the average of the percentages

An example should make this error apparent. Suppose it is the results of some examinations with which we are dealing and that the results are as follows :—

Total Number of Candidates.	Number of Passes.	Percentage of Passes.
349	314	90
163	119	73
1,286	605	47
Totals 1,798	1,038	58

The total number of candidates for the three examinations was 1,798, and the corresponding number of 'passes' was 1,038, hence the *average* percentage of 'passes' was $\frac{1,038 \times 100}{1,798} = 58\%$, though the percentage of passes for each examination separately was 90%, 73%, and 47%, and the average of these is $\frac{90 + 73 + 47}{3} = \frac{210}{3} = 70\%$, which differs materially from the true 'average percentage of passes,' viz., 58 per cent. The 'average of the percentages' is an almost meaningless and useless quantity.

There is one case in which the two things (the 'average percentage' and the 'average of the percentages') have the same numerical value, that is when the total number of candidates for each examination is the same, as in the following illustration :—

Total Number of Candidates.	Number of Passes.	Percentage of Passes.
250	225	90
250	182	73
250	118	47
750	525	70

Average percentage $= \frac{525 \times 100}{750} = 70\%$ which is also $=$ the 'average of the percentages.'

That there are more Centenarians among Negroes than among White Races

This is not so, the explanation being that old negroes very rarely know their own age and love to magnify it. No official records of the dates of the births of these alleged

centenarians are available and consequently no dependence is to be placed on the unofficial statistics.

Mortality statistics are recorded and they are against the popular belief :—

State.	Mortality per thousand.	
	Whites.	Negroes.
Connecticut	15·00	22·41
Massachusetts	19·06	24·41
New Hampshire	16·23	26·50
Average for the whole United States (Males)	15·08	17·19

That 'Murder will out'

"Till then sit still, my soul; foul deeds will rise
Though all the earth o'erwhelm them, to men's eyes."
Hamlet, I., ii., 255.

"Stones have been known to move, and trees to speak;
Augurs and understood relations have
By magpies and choughs and rooks brought forth
The secret'st man of blood."
Macbeth, III., iv., 122.

"Truth will come to light; murder cannot be hid long; a man's son may; but, at the length, truth will out."
The Merchant of Venice, II., ii., 75.

In the leader, on the Crippen case, in the *Daily Mail* of Oct. 24, 1910, the following statement occurs :—"The case teaches one lesson of surpassing moral importance, which, though it is an old one, cannot be too often emphasised. Murder will out, be the precautions of the murderer what they may."

It is certainly to be regretted that this is a fallacy, and especially that it is more so here in London than it is in Berlin, for read what the *Globe* said on July 21, 1910 :—"The Berlin police possess apparatus for the detection of criminals far superior to that at the disposal of our Scotland Yard authorities, which explains a recent statement of the Prussian Home Minister that out of 118 capital crimes reported to the Berlin police since 1899, only eight had remained undetected, 'whereas in London, according to the latest statistics, the proportion of such crimes of which the perpetrators had remained undiscovered was 23½ per cent.'"

In opposition to this we have the old police adage (which probably errs on the other side), that " if you don't catch a murderer in the first 24 hours, you don't catch him at all."

" The maxim ' Murder will out ' is disproved by statistics. In the 10 years ending with 1886, there were 1,766 murders committed in England and Wales, and in 1,094 of these cases no trace of the criminal was ever found that led to his apprehension."—*Great Thoughts*, Feb. 23, 1895.

1,094 is 62 per cent. of 1,766 ; a *terribly* large proportion.

That in all circumstances One Added to One makes Two

This looks like a hard proposition to disprove, for nothing seems simpler than that one penny plus one penny are equal to two pennies, but wait till you have read what Sir Oliver Lodge, F.R.S., has to say on the subject :—

" In order to illustrate the matter further, in what may seem almost a frivolous way, I would contend that whereas the proposition that one added to one makes two is abstractedly beneath controversy, it need not be true for the addition of concrete things. It is not true for two globules of mercury, for instance, nor for a couple of colliding stars ; not true for a pint of water added to a pint of oil of vitriol, nor for nitric oxide added to oxygen, nor for the ingredients of an explosive mixture ; not necessarily true, either, for snakes in a cage, or for capital invested in a business concern, flourishing or otherwise ; nor is it true, save in a temporary manner, for a couple of trout added to a pond. Life can ridicule arithmetic." —*Hibbert Journal*, Jan., 1912.

The following eight Popular Fallacies on the birth-rate question are dealt with by C. V. Drysdale, D.Sc.(Lond.), F.R.S.E., M.I.E.E. They appeared originally in *The Malthusian* of the respective dates which are given at the end of each article, and we are obliged to Dr. Drysdale for permission to reproduce them.

That the Declining Birth-Rate means Depopulation

This is a complete error. So far from it being true that the fall of the birth-rate which has taken place up to the present has caused any diminution of population, the population of Europe has gone on increasing *at a faster rate* the

more the birth-rate falls. It is not *births*, but *survivals*, which populate a country, and if by limiting births the blind struggle for existence is replaced by a condition in which all can work together for the common good, efficiency of production is increased and the survival of life is greater instead of less. Here are some of the rates of "natural increase"—*i.e.*, excess of births over deaths for periods immediately before the setting in of the declining birth-rate and recently :—

	Period.	Birth-rate.	Death-rate.	Natural increase.
England and Wales ...	1871–75	34·1	21·3	12·8
	1901–05	27·7	16·3	11·4
France	1881–84	38·9	37·0	1·9
	1901–05	21·2	19·6	1·6
German Empire ...	1872–75	40·0	27·9	12·1
	1901–05	34·4	19·9	14·5
Holland	1871–75	36·1	25·6	10·5
	1901–05	31·6	16·1	15·5
Europe	1871–75	39·1	30·6	8·5
	1901–04	36·2	23·5	12·7

It will be seen, therefore, that although in England and Wales and in France there has been a slight drop in the rate of increase (not a decrease of population) it is very small in comparison with the fall in the birth-rate, while in Germany, Holland and Europe as a whole the natural increase of population has been rapidly *rising* as the birth-rate falls, owing to the greater fall of the death-rate.—Jan. 15, 1913.

That France is a "Dying Nation"

This is a "terminological inexactitude." Although the excess of births over deaths in France has always been very low, and in some years has even been turned into a decline, there has, on the whole, been a steady rise of the population by natural increase apart from immigration. Immediately after the Franco-German War of 1871 the population stood at 36,000,000. By 1884 it has risen to 38,000,000, and it is now about 39,500,000. It is true that in 1907 there was an excess of deaths over births of 20,000, but there were similar decreases in 1854 and 1855, 1870-1871 (the war years), 1890, 1891, 1892, 1895 and 1905. The birth-rate in 1853 was 26 per 1,000, and it has since fallen to 19 ; but this has not caused a diminution of population, owing to a fall of the death-rate

from 24 to 18. It cannot be too widely recognised that when the Franch birth-rate was 39 per 1,000, just before the Revolution, its death-rate was 37 per 1,000, so that it was only increasing by 2 per 1,000 per annum, or at hardly any greater rate than at present.

France is not decreasing in population, but only increasing very slowly ; and there is no justification for supposing that an increase of its birth-rate would make its population increase more rapidly, or that a further fall of its birth-rate will make it increase any less rapidly than at present. So long as its death-rate is about 17 or 18 per 1,000, instead of 10 per 1,000, as in New Zealand and Australia, those who want to increase the French population should seek to reduce its death-rate instead of increasing its birth-rate. This can only be done by increasing its supporting power through improvements in agriculture and manufactures ; but the agriculture of France is already highly developed, and its natural facilities for manufactures too inferior to those of England and Germany for her to compete very successfully. —Feb. 15, 1913.

That the Declining Birth-Rate in Europe means the numerical ascendancy of the East, and the "Yellow Peril"

This cry, which has been frequently raised, is absolutely without foundation. It arises from the usual blunder of mistaking birth-rates for survival rates, or of neglecting the effect of the death-rate. The birth-rates of most Eastern countries are probably very high. The Census Commissioners have given the birth-rate of India as 50 per 1,000 ; Cairo and Alexandria in Egypt show a similar figure ; and China is probably not far behind if it is not even more prolific. When we compare this "glorious fertility of the East," as one of our bishops has called it, with our own birth-rate of 24 per 1,000 or the present European birth-rate of about 35 per 1,000, which is steadily falling, it sounds very plausible to talk of the "yellow peril."

But when we come to consider death-rates and survival-rates, the whole scare vanishes. In India, with its birth-rate of 50 per 1,000, the increase of population in the decade 1891-1901 was only 2·4 per cent., or practically the same as that of France and less than a fifth of the rate of increase of

Europe during the same period. In the last decade 1901-11 the increase of the Indian population was about 5 per cent., while it was about 13 per cent. in Europe. No reliable figures for China are available, but there is reason to believe that its increase is no greater than that of India. Furthermore, the more the birth-rate of Europe has fallen the more rapidly has the death-rate gone down, so that the rate of increase of the European population is accelerating, and is far greater than at any previous period. The excess of births over deaths has actually increased from 10 per 1,000 per annum or less, before the declining birth-rate set in, to over 12 per 1,000 at the end of last century. Every year of the falling birth-rate therefore makes Europe stronger in numbers as compared with the East ; while as regards strength, the starvation and poverty of the East, the results of its high birth-rate, make it increasingly inferior to Europe. Every year of the falling birth-rate makes the " yellow peril " more remote.—Mar. 15, 1913.

That Australasia, because of its adoption of family limitation, is in danger of " Race Suicide, " and of Invasion by Japan

This fallacy is a favourite one with such prominent authorities as ex-President Roosevelt and the Bishop of London. In his review of Mr. Beale's *Racial Decay*, Mr. Roosevelt has said that " the rate of natural increase in New Zealand is lower than in Great Britain," and that Australia " increases so slowly that, even if the present rate were maintained, the population would not double itself in the next century." The Bishop of London, in a recent visit to Australia, deplored the low birth-rate, and stated that it was a question whether Australia would not cease to be British in a few years. A protest was sent to the papers from the Australian High Commissioner, pointing out that, owing to its low death-rate, Australia almost headed the list for rapid natural increase of population, apart from immigration. Here is the list of birth and death-rates and rates of natural increase in the countries given by the High Commissioner, to which we have added the number of years required to double the population at that rate, and the increase of population in a century. The figures are for 1906-1910, and are taken from the Registrar-General's Report for 1910.

	Birth-Rate.	Death-Rate	Rate of Natural Increase.	Number of Years to double.	Increase in a Century *
New Zealand ...	27·1	9·7	17·4	40	5·70
Australia ...	26·7	10·7	16·0	44	4·95
Netherlands ...	29·1	13·7	15·4	45	4·66
German Empire...	32·1	17·9	14·2	49	4·14
Norway	26·3	13·8	12·5	56	3·49
England & Wales	26·3	14·7	11·6	60	3·19
Austria	33·6	22·3	11·3	62	3·19
Japan	32·5	20·9	11·6	60	3·19
Ontario	24·1	14·2	9·9	71	2·69

The value of such remarks as those of Mr. Roosevelt and the Bishop of London is shown by the fact that Australia and New Zealand are increasing much faster than our own country, and 50 per cent. faster than Japan, which is supposed to be their great danger. As to not doubling once in a century Australia would do it twice over and have a considerable margin to spare.—May 15, 1913.

That Germany has not adopted family limitation, and that it is consequently increasing its population faster than other countries and becoming thereby more powerful for war

This is a fiction which is industriously circulated by militarists. Dr. Bertillon, in his *Dépopulation de la France*, mentions that the birth-rate in Germany for the decade 1841-50 was 36·1 per 1,000, and precisely the same in the decade 1891-1900, leaving it to be inferred that the German birth-rate has been unaffected by the modern tendency to family limitation. What really happened was that on the formation of the German Empire the birth-rate rapidly rose to 41·8 per 1,000 in 1876, the year of the Knowlton trial, and has since fallen to 29·4 in 1911, so that the decline is faster than in most other countries. It is quite true that the German population is increasing very rapidly, but this is due to the great fall in the death-rate, which averaged 27·6 per 1,000 in 1871-5 and dropped to 17·1 in 1911. As a result the population of the German Empire is now increasing by about three quarters of a million per annum, but this is in no way due to its still some-

* This is the number by which the initial population must be multiplied in order to arrive at the population at the end of the century.—Ed.

what high birth-rate, as New Zealand, with a lower birth-rate (27 per 1,000), has a much higher rate of natural increase. Nor is the increase of the German population very satisfactory from the military point of view, as it is mainly in the towns; and there the physical deterioration is so serious that in Berlin and Hamburg the recruiting efficiency is only forty per cent. of the expected number. That the German people are fully alive to the serious results of the poverty and overcrowding due to large families is shown by the fact that a most extremely rapid fall in the birth-rate has now set in in the principal towns, and there can be little doubt that in a few years the German birth-rate will drop considerably below that of most other countries, perhaps even below that of France.—June 15, 1913.

That Canada and other Colonies should have a High Birth-Rate because they are "calling out for men"

This fallacy is the correlative of the usual contention that over-population can be corrected by emigration. As before pointed out, every human being passes through a period, as a child, when he is only a consumer and has no productive value. In a new country like Canada it is no doubt true that at certain seasons, such as that of harvest, there is a great need of extra manual labour. But this need is frequently very temporary, and the accounts which often reach us, telling us of unemployment in the Canadian towns, make it decidedly open to question whether the advantage of having these men at such periods is sufficient to compensate the country for having to support them for the rest of the year. As regards children, however, with their long period of unproductive consumption, there can be no question that they are a drain on the community, instead of an asset to it, until they arrive at efficient maturity. If they are able to do so, so much the better for the future; but if, as so frequently happens, they die before reaching this stage, the country which is "calling out for men" has been burdened with these unproductive children without any gain to itself or to them. What advantage is it, then, that they should have been born?

As a matter of fact Canada has itself given a most striking illustration of the uselessness of a high birth-rate. In Ontario —the only part for which figures appear to have been kept— the birth-rate was only about 19 per 1,000 in the year 1900,

and the death-rate 10 per 1,000, as in New Zealand. Since then the birth-rate has risen to about 24 per 1,000 and *the death-rate has gone up* to 14 per 1,000. Practically the whole result of this additional production of life has been to fill the graveyards. This is in precise conformity with the population doctrine, and shows the criminal folly of incentives to high birth-rates.—July 15, 1913.

That intensive cultivation or prolific varieties of corn, etc., would enable the food supply to be very greatly increased and to cope with an unlimited population

This is an extremely prevalent fallacy, which has been greatly fostered by the writings of Prince Kropotkin. We hear of new very prolific varieties of wheat, of the wonderful profits made by the French and Channel Islands fruit growers, etc., and we are told that if these methods were adopted all over the United Kingdom, we could easily provide for our own population and for its unrestricted increase.

Those who know anything about France, however, know that while it is perfectly true that its agriculture is excellent and its land is very fully utilised, its annual increase of output is very small. This is the explanation of the slow rate of increase of the French population, which is *not* due to its low birth-rate, since Ontario, with a similar birth-rate, had a very rapid rate of increase.

The egregious fallacy in this case is the total disregard of the fertilisation of the soil and the nutritive value of the products. Most fruits contain little nutriment and are largely composed of water, so that there is nothing remarkable about their great increase with intensive culture. Although useful as a part of diet, they hardly constitute a food. A prolific variety of wheat, *combined with heavy manuring of the soil*, will certainly produce a very heavy crop from a given limited area ; but the amount of manure available is decidedly limited, and it would be impossible to obtain sufficient to provide for the intensive culture of a very large portion of the earth's surface. This has been very clearly shown by Sir Wm. Crookes in his Presidential Address to the British Association in 1898. By the production of artificial nitrogenous fertilisers from the air by electrical or other means the food supply can no doubt be increased, but it will have to increase six or seven times as fast as it does at present to provide for an unchecked popu-

lation; and up to the present the electrical production of fixed nitrogen has not been sufficient to affect the harvest by one per cent.—Sept. 15, 1913.

That National Efficiency is promoted by Early Death

A number of the opponents of family limitation have been brought to admit that it is accompanied by a diminution of the death-rate and an increase of the average length of life, but contend that this is a disadvantage, as they claim that national efficiency depends upon having a large proportion of young people, and that it is better that people should die off after fifty years of age or so, leaving the field to the younger generation.

This doctrine is another example of that callous and brutal stupidity which has been passed off as scientific teaching by some eugenists, militarists, and disciples of "progress"; and it is the companion doctrine to the worship of the struggle for existence. The fallacy here is twofold, first in not recognising that many things contribute to national efficiency besides youthful energy and enterprise; and second in failing to see that as an average the amount and duration of such youthful powers bear a relation to the average total duration of life. As regards the first point, although youth is the time for discovery and the building up of capital, age is the season of conservation and of prudent counsel. At the present time of very rapid transition it is true that the experience of age is of less importance than it has frequently been, but there is no justification for supposing that this condition will long continue.

But the second is the more important point. A short average duration of life does not mean obtaining the full powers of humanity and a casting away when these powers begin to decline. People do not die early *as an average* unless they have been underfed or have suffered from disease or bad conditions which must have impaired their whole working powers. If we could maintain all our young people in the highest state of efficiency, and send them to the lethal chamber when their powers waned below a certain point, there might be something to be said for a short life, but when short life is due to malnutrition and to tuberculosis and other wasting diseases which sap the vitality over a long period of what might otherwise be a useful existence, the contention is absurd. No good business man would

use either a horse or a machine in the way suggested by these authorities, and engineers have long since learned the great difference which exists between the using of a machine at maximum output or at maximum efficiency.

In Nasmyth's fascinating autobiography he gives a diagram of life, representing it as rising, reaching a maximum of efficiency, and afterwards setting, like the sun in the sky. What the apostles of efficiency suppose is that a short average life means the rising and reaching the zenith, but a cutting off of the ineffective latter portion. What it really means is a *reduction of the whole curve* so that there is the same rising and setting *but a lower maximum*, and the efficiency is nowhere so high. Wherever we have nations of high death-rate, such as India or Russia, we hear of the people ageing very rapidly, and it cannot be even pretended that these countries are ones of high efficiency. The whole tendency of modern times is to magnify life both in duration and quality. A longer training is required with a longer and more powerful maturity, and a more experienced and capable old age, and it is sheer folly to suppose that we can gain in efficiency by making our conditions such that people are " too old at forty " or die before their normal span of life. That nation is the highest and most efficient whose people live the longest.—Aug. 15, 1914.

NOTE.—This concludes Dr. Drysdale's eight articles.

That in all cases of 'whole life' insurance policies, if you live to a great age you will have paid in more than the sum which will be paid to your estate on your death

Life insurance is a desirable thing, but it must not be lightly undertaken, for, like marriage, it may be a lifelong success or failure! The choice of an insurance company, and even of the kind of policy require great care, and, like most things, the more you look into them, the more you find there is in them. An extremely important feature is what 'surrender values' are guaranteed. This is a point often overlooked, because at the time of effecting an insurance one is probably in a fairly safe financial position and, consequently, does not think of what would happen if the premiums were not paid.

Coming to the statement above, it certainly should *not* occur if you exercised the care we have just implied, for any

good company will add so much to the value of the policy in the form of ' bonuses ' as to make it more than the sum of the premiums paid. Or you may take the bonuses in cash, or you may have them used to decrease the premium paid. In the latter case, if you reach a certain age, depending on when you insured and the kind of policy, the company will start paying *you* an annual premium, small at first and gradually getting larger according to how much you exceed your ' expectancy ' of life.

That the ' Average ' Event is always the most Likely Event

To those who would know something of modern methods of statistical analysis we strongly recommend *Primer of Statistics*, by W. P. and Ethel M. Elderton. In Chapter IV. thereof they discuss cricket averages and go on to say (p. 40), " At first sight it might seem that the average number of runs a man makes would be that which is his most likely score in any particular innings. A little consideration will show that this is not necessarily the case. Imagine the case of a cricketer who seldom made runs at all, and assume that he made the following scores in succession :—

" 5, 6, 9, 8, 5, 0, 1, 3, 12, 0, 2, 0, 5, 0, 11, 8, 0, 10, 0, 1, 2, 6, 1, 0, 3 ; or 25 innings for 98 runs, or an average of 3·92 ; but if you count up the number of innings and arrange them as a distribution you will find :—

Number of runs in innings ...	0, 1, 2, 3, 5, 6, 8, 9, 10, 11, 12
Number of innings	7, 3, 2, 2, 3, 2, 2, 1, 1, 1, 1.

" From this table you will see that this batsman never made 4, and only twice made 3 in an innings ; but on 7 occasions he did not get any runs at all, and 3 times he only made 1 run ; while he made less than his average on 14 occasions, and more than his average on only 11. Clearly if you had to guess how many runs he made in some particular innings you would say he did not get any, and in 7 cases out of 25 you would be right. If you guessed 4, you would be wrong every time. This shows that the ' average event ' is not always the ' mode,' which is the technical term for the most likely event."

That the accuracy of the mean of a number of dimensions depends directly on the number of measurements taken

In Chap. VI. of *Primer of Statistics*, the Eldertons discuss probable errors, and at p. 76 we read :—" If the mean size

of a nut is calculated from 5,000 nuts, we should feel fairly certain about the result ; but if we based our mean value on only five cases, we should not feel so happy about it. In other words, we must use the number of cases investigated as well as the standard deviation in estimating the accuracy of a mean which has been calculated. In order to bring in the number of cases properly, it does not follow that we must divide the standard deviation by the number of cases investigated. It has, in fact, been shown that the accuracy depends, not on the number, but on the square root of the number of observations ; so one doubles the accuracy by taking four times, and trebles the accuracy by taking nine times, the number of measurements."

That People cannot be made Sober by Act of Parliament

This is or was a most common statement, usually uttered perhaps by those who were afraid lest the experiment should be tried ! It took two years of the Great European War to prove it a fallacy as regards England, though our allies the French and Russians discovered the falsity of the theory in far less time—much to their benefit.

The following statistics prove the case :—

" The combined effect of the ' no-treating ' order and last Monday's new order restricting the hours for the sale of drink has already produced a fall in police court charges of drunkenness in London.

" The statistics of thirteen police courts, given below, show a total of 372 cases of drunkenness for the week ending December 4, compared with 612 cases in the week preceding the new orders. This represents a reduction of about 40 per cent. Many of the charges last week came before the court on the Monday (Nov. 29), and were for offences committed before the new restriction order came into force. Thus at East Ham 8 of the 9 charges heard last week were heard on the Monday. From Tuesday to Friday inclusive, there was not a single charge of drunkenness at that court. At West Ham there were 18 charges of drunkenness on the Monday, and only 12 from Tuesday to Friday inclusive.

" The following table shows the charges of drunkenness *last Saturday* compared with the preceding *Saturday*, and the total for last week compared with the week before the ' no-treating ' order :—

	Dec. 4.	Nov. 27.	Week to Dec. 4.	Week to Oct. 9.
Westminster ...	2	8	31	77
Tower Bridge ...	8	6	48	74
Marylebone ...	5	10	42	58
Clerkenwell ...	4	10	24	51
Thames	8	15	61	101
South-Western ...	2	0	29	35
Lambeth	7	3	47	75
Hampstead ...	0	1	1	1
East Ham	1	0	9	9
West Ham ...	12	4	42	57
Greenwich ...	5	3	26	44
Willesden	0	1	10	21
Acton	0	1	2	9
	54	62	372	612"

—*Daily Mail*, Dec. 6, 1915.

"North of the Tweed the orders of the Board have been insufficient to bring home the national duty of temperance to a considerable section of the community," said Lord d'Abernon, the chairman of the Central Liquor Traffic Control Board, in Glasgow yesterday.

"Comparing the four weeks ending Dec. 19 with the four weeks before the Board's orders came into force, the convictions for drunkenness in Edinburgh showed no decrease, and in Aberdeen there had been an increase of 6 per cent. In the same period the following decrease percentages were recorded:—

London	33	Sheffield	48
Liverpool	45	Glasgow	18
Bristol	41	Dundee	12
Leeds	67		

"In England the average decrease per town had been nearly 50 per cent. In Scotland it was only 6 per cent. It had been reported that the treating prohibition had been evaded or deliberately broken. Whether drunkenness was normal or not in the Glasgow district, it was clear that it was excessive and was a great bar to efficiency."—*Daily Mail*, Jan. 19, 1916.

" The following returns have been issued from an official source :—

" Convictions for Drunkenness.

" England.

	Weekly average January to June, 1915.	Weekly average, January to June, 1916.
Greater London	1,077	569
Liverpool	207	107
Manchester	80	49
Newcastle	63	37
Birmingham	37	24
Leeds	24	10
Sheffield	22	11
Middlesbrough	27	10
Scotland.		
Edinburgh	120	79
Glasgow	522	299

Delirium Tremens.

Cases treated in representative areas :—

Liverpool.	
August, 1914, to January, 1915	256
August, 1915, to January, 1916	118
East London and Woolwich.	
December, 1914, to April, 1915	109
December, 1915, to April, 1916	59."

—*Sunday Times*, Aug. 13, 1916.

That if a house, or other place, has been hit by a bomb, it is infinitely less likely to be hit again than if it had not been hit in the first instance

In other words one hit is supposed practically to produce immunity from further trouble. This is an almost universal belief, and it is frequently said that if you wish to be absolutely safe, the thing to do is to take shelter in a bomb crater! One attack of small-pox does practically produce immunity from a second attack, but the reason for this is an entirely different matter.

We will begin by a very simple illustration. If you toss a penny it is bound to fall either a ' head ' or a ' tail,' and the

chance of its falling a 'head' is therefore one in two, or $\frac{1}{2}$. On tossing it a second time, the chance of its falling a 'head' is absolutely the same, viz., $\frac{1}{2}$, but the chance of *both* tosses yielding 'heads' is only $\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$. It is easy to demonstrate this very elementary problem in probability thus :—

Let H represent 'head' and T represent 'tail,' then—

1st Toss.	2nd Toss.
H	T
T	H
T	T
H	H

These are the only four possible *different* ways in which the coin can fall in two tosses, and of these only one consists of both being 'heads,' *i.e.*, the chance of two heads occurring is $\frac{1}{4}$. Similarly, supposing that in anyone air-raid the chance of any particular house being hit by a bomb is one in 70,000, then in any subsequent similar raid the chance of that house being hit is again $\frac{1}{70000}$ and the chance of its being hit in both raids is $\frac{1}{70000} \times \frac{1}{70000}$, or one in 4,900,000,000! But though the double event is so microscopic, when one event has occurred it does not in the slightest degree reduce the chance of the second hit taking place, though we hope we shall not be prosecuted under the Defence of the Realm Act for stating this fact! We have assumed in the foregoing that the bombs are dropped promiscuously. If the raiders are assumed to be able to aim at particular objects, then the calculation is no longer true as an average event for the whole town. But even in the case of a certain amount of aiming, the principle is the same, though the actual chances may be different. Suppose, for example, that the aiming increases the chance of hitting a particular house in one raid to one in 30,000, and that the house is in fact hit, then for all this the chance of its being hit in any one subsequent similar raid is still exactly one in 30,000, no more and *no less*, while the chance of two hits in any two such raids is $\frac{1}{70000} \times \frac{1}{80000}$, *i.e.*, one in 900,000,000.

This little investigation does not bear out the popular statement that "troubles never come singly," for while a

single trouble of the above kind *may* occur on an average once in 70,000 times, we see that for it to occur twice we should require *on an average* 4,900,000,000 events ! !

That most Suicides are committed in November

How this fallacy has arisen there is no saying. " May and June are, in most countries, the months in which most suicides occur, though in Bavaria and Saxony the maximum is in July. The difference between the warm and cold portions of the year is more marked in female suicides than in male suicides, especially in Italy. This is probably due to the fact that women show a tendency to adopt drowning as a mode of killing themselves, and that there is more shrinking from a cold plunge into water in cold than in warm weather."—W. Hooper, M.A., *Ency. Brit.*

In England, from 1863 to 1876, 26 per cent. of the suicides were by females. Fifty-five is the age at which most men (and women) commit suicide, the rate at that age being 396 per million of people of all ages alive, though at 65 for males the rate only drops to 394 per million. These results are from data obtained during the thirty years 1853 to 1883.

" Few would imagine that *one* out of every 119 young men who reach the age of 20 dies ultimately by his own hand ; yet such is the case."—Dr. Ogle.

" And according to Dr. Ogle's figures *one* out of every 312 girls who reach the age of 15 ultimately dies by her own hand.

" As to the influence of occupation Dr. Ogle found that the rate of suicide for soldiers is enormosuly in excess of that for any other occupation, but it is followed at a considerable distance by innkeepers and other persons having constant access to alcohol, a fact which certainly suggests that the excessive use of spirits is one of the principal causes of suicide."—W. Hooper, M.A., *Ency. Brit.*

" Berlin, Sunday.

" Curious official statistics are published indicating the favourite seasons for committing suicide in Prussia. May, June, and July are the ' popular ' months. Men prefer July, while women favour May. The fewest suicides take place in February. Thirty per cent. of the male and 28 per cent. of the female suicides occur in the spring time, and the next most in the summer, autumn, and winter in the order named.

" Berlin registers an average of twenty suicides weekly in June. Youthful persons prefer the night time for suicide, while adults oftener choose the morning or afternoon. The fewest suicides occur immediately after sunset. Monday, Tuesday, and Thursday are the ' favourite ' days. The fact that most suicides occur on Monday and Tuesday is attributed to the reaction after too joyful Sundays. Friday shows the fewest suicides, because people on the brink of despair often recover their courage in anticipation of the payment of weekly wages next day. The smallest number of suicides take place on Saturday (pay-day) and Sunday, although the number of women who take their own lives on the Sabbath is relatively high. This is attributed to the fact that women who live alone feel their loneliness, especially on Sundays."—*Daily Mail*, Aug. 24, 1909.

That the yield of wheat per acre of land in Great Britain is easily the highest in the World

Prof. James Long had a one-column article in the *Daily Mail* of Oct. 20, 1914, headed, " Can Germany be Starved Out ? " in which he said :—

" There is a curiously conservative belief that as an agricultural country Germany is much inferior to Great Britain, and that our yield of corn per acre is easily the highest in the world. I suppose that all farmers believe this to be true, but, as it is not, the fallacy may as well be disposed of at once. Thus, comparing the leading foodstuffs produced in the two countries, we get the following figures, which are taken from the official returns :—

AVERAGE YIELD PER ACRE.

	United Kingdom.	Germany.
Wheat	... 31·74 bushels	... 30·01 bushels
Barley	... 33·86 ,,	... 35·37 ,,
Oats ...	... 41·84 ,,	... 44·08 ,,
Potatoes	... 5·42 tons	... 5·22 tons

" In 1912, the last year for which figures are available, Germany produced 33·6 bushels of wheat, 39 bushels of barley, 44·4 bushels of oats, and 5·99 tons of potatoes to the acre. Her corn, including rye, covered 35,000,000 acres and her potatoes 8,250,000 acres, whereas our corn area reached only 7,858,000 acres and our potatoes 1,207,000 acres. Thus Germany possesses the initial advantage of greater relative area under cultivation—1·2 acres per unit of popula-

tion, against 1 acre with us—a much greater extent of corn-growing land, a larger combined yield of direct foodstuffs per acre, and by no means least of all, an enormous agricultural population, the importance of which lies in the fact that it comprises 5,000,000 occupiers who are the chief owners of the land."

That China is the most densely populated country in the World

" China's teeming millions " is a common expression, and is true, but when *density* is spoken of, the vast area of China is not realised, consequently the author found the following surprising results when looking up the matter early in 1914 :—

	Population per Square Mile.
China	2·7
United States of America (1900) ...	21
United Kingdom...	342
Belgium	636

That very few Passenger Boats start on Fridays owing to the superstitious objections of many passengers, and the crews

The following is the list of sailings, at the time of writing, of the Canadian Pacific Company :—

R.M.S. *Empress of Britain* (Twin-screw), *Friday, Nov. 13,* 1908 ; S.S. *Lake Erie* (Twin-screw) (Via Belfast), Wednesday, Nov. 18, 1908 ; R.M.S. *Empress of Ireland* (Twin-screw), *Friday,* Nov. 27, 1908 ; R.M.S. *Empress of Britain* (Twin-screw), *Friday,* Dec. 11, 1908 ; S.S. *Lake Manitoba* (Twin-screw) (Via Belfast), Wednesday, Dec. 16, 1908 ; R.M.S. *Empress of Ireland* (Twin-screw), *Friday,* Dec. 25, 1908 ; S.S. *Corsican* (Chartered by C.P.R.), (Twin-screw), *Friday,* Jan. 8, 1909 ; R.M.S. *Empress of Britain* (Twin-screw), *Friday,* Jan. 15, 1909 ; S.S. *Lake Champlain* (Twin-screw) (Via Belfast), Wednesday, Jan. 20, 1909 ; R.M.S. *Empress of Ireland* (Twin-screw), *Friday,* Jan. 29, 1909 ; R.M.S. *Empress of Britain* (Twin-screw), *Friday,* Feb. 12, 1909 ; S.S. *Lake Erie* (Twin-screw) (Via Belfast), Wednesday, Feb. 17, 1909 ; R.M.S. *Empress of Ireland* (Twin-screw), *Friday,* Feb. 26, 1909 ; S.S. *Lake Manitoba* (Twin-screw) (Via Belfast), Wednesday, Mar. 3, 1909 ; R.M.S. *Empress of*

Britain (Twin-screw), *Friday*, Mar. 12, 1909; S.S. *Lake Champlain* (Twin-screw) (Via Belfast), Wednesday, Mar. 17, 1909; R.M.S. *Empress of Ireland* (Twin-screw), *Friday*, Mar. 26, 1909; S.S. *Lake Erie* (Twin-screw) (Via Belfast), Wednesday, Mar. 31, 1909; R.M.S. *Empress of Britain* (twin-screw), *Friday*, April 9, 1909; S.S. *Lake Manitoba* (Twin screw) (Via Belfast), Wednesday, April 14, 1909; R.M.S. *Empress of Ireland* (Twin-screw), *Friday*, April 23, 1909.

Please notice that even Friday, Nov. *13*, is not avoided!

The P. & O. boats sail on Fridays.

The Union-Castle Mail Steamship Company's boats leave Southampton for South Africa on Saturdays, but they often sail from London the day before; *e.g.*, the *Durham Castle* left London on Friday, Oct. 9, and the *Avondale Castle* left on Friday, Oct. 23.

Two more illustrations must suffice. They are extracts from the lists of sailings of two more large companies:—

ORIENT ROYAL MAIL LINE (FOR AUSTRALIA).

	Leave London:	Leave Marseilles:
Ortona ...	Wed., Sept. 18, 1908.	*Friday*, Sept. 25, 1908.
Ophir ...	*Friday*, Oct. 2, 1908.	*Friday*, Oct. 9, 1908.
Oruba ...	*Friday*, Oct. 16, 1908.	*Friday*, Oct. 23, 1908.
Omrah ...	*Friday*, Oct. 30, 1908.	
Ortava ...	*Friday*, Nov. 13, 1908.	
Ormuz ...	*Friday*, Nov. 20, 1908.	

ROYAL MAIL STEAM PACKET COMPANY.

Asturias ...	leaves Southampton,	*Friday*, Oct. 2.
Thames ...	,, ,,	*Friday*, Oct. 9.
Aragon ...	,, ,,	*Friday*, Oct. 16.
Amazon ...	,, ,,	*Friday*, Oct. 23.
Araguaya ...	,, ,,	*Friday*, Oct. 30.

That Emigration Diminishes the Population of the Country of Origin

"Emigration does not diminish the population of the country which the emigrants leave; it only increases its birth-rate."—Dean W. R. Inge, C.V.O., D.D., F.B.A., p. 93, *Outspoken Essays* (1921).

That four children are required per each married couple for the population to increase

" The hoary fallacy that four children are required for each married couple for the race to increase seems to be much in evidence just now. M. Clemenceau has been quoting it in connection with the French Commission on the Birth Rate, and in the January *Eugenics Review* Mr. Mudge quotes Mr. and Mrs. Whetham that ' it is necessary, in order that a population shall maintain its numbers, for every family to produce at least four children.'

" A few years ago, in our articles on the Malthusian Doctrine and its Modern Aspects, we examined this statement, and showed that an average of $2\frac{1}{2}$ births per marriage would suffice for maintaining a fair increase of population, even allowing a reasonable deduction for celibacy, sterility, and infantile mortality. This calculation has received striking confirmation from the figures given in M. Leroy Beaulieu's book dealt with in this issue, which show that the French population has continued to increase steadily during the last three decades, with an average of only about $2\frac{1}{2}$ births per marriage, in spite of an excessive infantile mortality.

" We have recently made some further calculations based on the proportion of marriageable people in this country, and have come practically to the same result. In view of the French figures above quoted, however, it is unnecessary to go into this calculation, and the four-child family doctrine may be taken as finally exploded."—*The Malthusian*, Feb. 15, 1920.

That Simpson's Rule is correct to the second order only

R. A. P. Rogers, writing from Trinity College, Dublin, on March 20, 1920, said, ". . .the almost universal illusion that Simpson's rule is correct to the second order only, *i.e.*, for the parabola—

$$y = a + bx + cx^2.$$

It is easy to show by single integration that Simpson's rule holds to the *third* order, *i.e.*, for *all* cubics of the form—

$$y = a + bx + cx^2 + dx^3$$

passing through three chosen points. It is thus precisely accurate, not only for the parabola, but also for a singly *infinite* number of curves passing through the three points, even if an inflexion occurs."—*Nature*, April 1, 1920, p. 138.

$$\text{That } x^\circ = 0, \text{ and that } \sin^{-1} x = \frac{1}{\sin x}$$

The first of these errors may be detected by reasoning out the steps in the following :—

$$x^3 = 1 \times x \times x \times x$$
$$x^2 = 1 \times x \times x.$$
$$x^1 = 1 \times x.$$
$$\therefore\ x^0 = 1.$$
$$\text{and } \therefore\ x^{-1} = \frac{1}{x}$$

The last of these equations being true (so are the others !), it is most natural that one expects—

$$\sin^{-1} x \text{ to be } = \frac{1}{\sin x},$$

and it is a pity that so misleading a form should have been adopted. $\text{Sin}^{-1}x$ is called inverse notation, and if $\sin^{-1}x = \theta$, then the equation means that $\sin \theta = x$.

FALLACIES CONNECTED WITH THE WEATHER

As we are reprinting in full the Presidential Address on Weather Fallacies, by Mr. Richard Inwards, to the Royal Meteorological Society in 1895, besides some other matter, we are giving all the Weather Fallacies together, and for still further information on the subject the reader is referred to *Weather Lore, a Collection of Proverbs, Sayings, and Rules concerning the Weather*, compiled and arranged by Richard Inwards, F.R.A.S., F.R.M.S.

Weather Fallacies.

[An abridgment of an address delivered to the Royal Meteorologica Society by Mr. Richard Inwards, President. (Reprinted from the *Quarterly Review* of the Society, by kind permission of Mr. Inwards and the Secretary.)]*

"In the long and patient pursuit which the attainment of all accurate knowledge exacts from man, it may sometimes be instructive to turn one's gaze backward and contemplate the errors which have been corrected, the fallacies which have been demolished, and the superstitions which have been lived down ; and this consideration has prompted me to take for the subject of this year's address that wide range of human opinion which may fitly be classed under the head of ' Weather Fallacies.'

" One of our Fellows, Mr. J. C. Wood, has just given to the world an excellent and scholarly translation of the work of Theophrastus, which has not previously been put in an English garb, and Mr. Wood has done the whole country a great service in giving us this translation of the ' Winds and Weather Signs,' a book which contains a host of rules and observations about the weather, and which, as might have been expected from the production of the favourite pupil of Plato and Aristotle, is singularly free from errors of the grosser and more superstitious kind, such as were plentifully produced in Western Europe many centuries later.

" In considering these early times, when the weather had to be studied from cloud, sky and sea, and from the

* This address also appeared in *Nature*, August 15, 1895.

behaviour of the animals and plants, we must be ready to excuse men for doing that which is still too frequently a cause of error, viz., foretelling what they most wished for, and putting down as universal law that which was only a coincidence of totally independent events. In considering weather fallacies it will be impossible to follow a chronological order, so I shall treat them, or rather a small portion of them, under the heads of saints'-day fallacies, sun and moon fallacies, and those concerning animals and plants ; while, finally, I shall consider the almanack makers, weather prophets and imposters who have from time to time furnished the world with materials for its credulity or its ridicule.

" The first class of weather fallacies, which I shall scarcely more than mention, are those which refer to the supposed connection between the weather of any day in the week or year and that of any other period, and it may be as well to state at the outset that there is no kind of foundation in fact for any of these so-called rules. They are for the most part born of the wish to see certain kinds of weather at certain times of year, and, like all these predictions, were faithfully remembered when they came true, and promptly forgotten when they failed. One has often heard—

' Fine on Friday, fine on Sunday,'

or that ' Friday is the best and worst day of the week,' and the superstition even extends to hours of the day, for we have—

' Rain at seven, fine at eleven.'

which is only another way of saying that rain does not usually last four hours, and the rule generally fails when applied to daily experience.

" It may be safely said that a new moon theory as to the weather comes out at least once a year, and it has been attempted to connect the honoured name of Sir William Herschel with a table which professed to show the dependence of weather changes on those of the moon.

" By the kindness of Mr. Symons I am able to show you on the screen a much magnified representation of this production, now very scarce, and which has the name of Herschel in large capitals, no doubt as a sort of ballast to give it weight and steadiness, though it does not definitely state that Herschel had anything to do with it. Herschel's own letter on the subject runs as follows :—

" ' SIR,—I am glad of an opportunity to say that prognostications of the weather are so much *above the knowledge* of astronomers that I have taken uncommon pains publicly to contradict reports of predictions that have been ascribed to me. You may, therefore, be assured that what you have heard as my opinion about the frost is without the smallest foundation. If at any time Slough should be in your road, I shall be very glad to see you here, and remain, Sir, your most obedient Servant,

" ' WM. HERSCHEL.

" ' Slough, near Windsor,
February 6, 1814.'

So that any Fellow of this Society who sees one of these diagrams in the future will know that it is a fraud.

" Of course it is in the power of everyone to check the predictions which are so often issued with respect to the changes of the weather taking place at the change of the moon ; but many eminent men have occupied themselves with the subject, and the result is that no correspondence between the two classes of phenomena has been established.

" Dr. Horsley examined the weather tables of 1774, as published by the Royal Society, and out of forty-six changes of weather in that year only ten occurred on the days of lunar influence, only two of them being at the new moon, and none at all at the full. M. Flarguergues, of Viviers, found also, as the result of twenty years' observations, that the barometer readings taken when the moon was farthest from the earth averaged 755 millimetres, and when nearest, 754 millimetres, showing a difference of one millimetre or about .04 inch, and this in a direction against the theory, the pressure being greater by that amount when the moon was farthest from the earth.

" Other fallacies about the moon are numerous, such as that the full moon clears away the clouds ; that you should only sow beans or cut down trees in the wane of the moon ; that it is a bad sign if she changes on a Saturday or Sunday ; that two full moons in a month will cause a flood ; that to see the old moon in the arms of the new brings on rain ; and many others, of which a catalogue alone would take up a good deal of space. M. Flammarion says that ' the moon's influence on the weather is negligible. The heat reaching us from the moon would only

affect our temperature by twelve-millionths of a degree ; and the atmospheric tides caused by the moon would only affect the barometric pressure a few hundredths of an inch —a quantity far less than the changes which are always taking place from other causes.' On the whole we are disposed to agree with the rhyme which thus sums up the subject :—

"'The moon and the weather
May change together ;
But change of the moon
Does not change the weather.'

"Even the halo round the moon has been discredited, for Mr. Lowe found that it was as often followed by fine weather as by rain, and Messrs. Marriott and Abercromby found that the lunar halo immediately preceded rain in thirty-four cases out of sixty-one. We always have a lingering hope that some future meteorologist will disentangle the overlapping influences, and arrive some day at a definite proof that our satellite after all has something to do with our weather.

"The more recent discoveries of prominences visible round the disc of the Sun during an eclipse, and of the light clouds only seen in M. Deslandres' spectro-photographs, will no doubt call out new weather theories on the subject. And I must confess to a wish that those mysterious flame-like bodies rushing from the Sun millions of miles into space, will be found to have some influence on the upper layers of our earth's atmosphere ; but I also hope that we may be saved from a theory on the subject until more facts are before us.

"Coming down to earth again, we are met by a long array of fallacies connected with the behaviour of animals and plants, and which have a supposed connection with weather changes. Few of these are so well grounded that they may be considered as proved, and as nothing is sacred to a meteorologist, our veteran Fellow, Mr. E. J. Lowe, F.R.S., has endeavoured to put some of the rules from this source to the test of definite observation. He took a number of well known signs said to indicate change, and carefully noted what happened after each sign, and although he does not say that all indications from animals, birds and plants are useless, yet certainly those he did investigate seemed utterly to break down.

"He took the well known signs of bats flying about in the evening, many toads appearing at sunset, many snails about, fish rising much in lake, bees busy, many locusts, cattle restless, landrails clamorous, flies and gnats troublesome, many insects, crows congregating and clamourous, spider-webs thickly woven on the grass, spiders hanging on their webs in the evening, and ducks and geese making more than usual noise. Mr. Lowe found that in 361 observations of the above signs, they were followed 213 times by fine, and only 148 times by wet weather; so that even after the prognostications for rain, there was a greater preponderance of fine weather. He called a day fine when no rain was measurable in the rain-gauge. Mr. Lowe says that even swallows flying low cannot be depended on, as, especially at the close of summer and autumn, they almost invariably skim the surface of the ground; and Mr. Charles Waterton, the naturalist, decided, after careful observation, that the unusual clamour of rooks forms no trustworthy sign of rain. These must, therefore, swell the list of fallacies, although there are many other rules which have not been so carefully examined, but which may still be true. My own impression is that although it is painful to dismiss the animals from their ancient position as weather prophets, we may consider them as indicating what they feel, rather than as predicting what is to come, and that their actions before rain simply rise from the dampness, darkness or chilliness preceding wet weather, and which render these creatures uneasy, but not more so than they affect man himself. The sheep turning its back to the wind (one of the best known signs of rain) is probably only that it may shelter its least protected part from the effects of the weather; and many of you must have observed sheep sheltering their heads from the heat by getting them into the shade of each other's bodies in a similar way.

"As to cows scratching their ears, and goats uttering cries, and many other signs of bad weather, they are at least very doubtful; whilst the adage about the pig which credits him with seeing the wind, carries with it its own condemnation.

"Plants have also their advocates as weather indicators; and there is no doubt that in most cases they act in sympathy with changes in the dampness, gloominess, or chilliness of the air, and as these conditions generally

precede rain, one cannot term the indications altogether fallacious. The pimpernel and the marigold close their petals before rain, because the air is getting damper, while the poplar and maple show the under surface of their leaves for a similar reason. Indeed, an artificial leaf of paper may be made to do the same thing, if constructed on the same principle as the natural one—a hard thin paper to represent the upper side of the leaf, and a thicker unsized paper for the lower side; these will, if stuck together, curl up or bend down in sympathy with the hygroscopic condition of the air. A slip of ordinary photographic paper will do the same, and will curl up at once when placed on the hand.

"The same slackness which moisture produces in plants applies in some degree also to insects, some of which can only fly in sunshine, so that there is a chain of weather signs all following from a little dampness in the air. The flowers close their petals and shut in their honey, the insects cannot fly so high, and the swallows seeking them skim the surface of the earth, and even then the threatened shower may not come.

"In 1892 attention was directed to a plant, the *Abrus precatorius*, a beautiful shrub of the mimosa kind, which has the property of being sensitive in a high degree, so that its pinnate leaflets go through many curious movements, and it was claimed that these form a guide of unerring certainty to foreshow the coming weather. Even earthquakes were said to be predicted by this wonderful plant. If it closed its leaflets upward, after the manner of a butterfly about to settle, fair weather was shown; when the leaflets remained flat, changeable and gloomy weather was indicated; while thunder at various distances was to be foretold by the curling of the leaflets, and the nearer the thunder the greater the curl, until, when the points of the leaflets crossed, the thunderstorm was indicated as being overhead. Changes of wind, hurricanes and other phenomena were to be shown by the various curious and beautiful movements of the leaflets and stalks. These movements undoubtedly took place, but when the plant was submitted to the unprejudiced observation of Dr. F. W. Oliver and Mr. F. E. Weiss, at Kew Gardens, those gentlemen failed to find any connection between these movements and the weather, and Dr. Oliver made a report on the matter, which hits the heart of the whole subject of plant movements, by

ascribing them for the most part to the agency of light and moisture. Mr. Scott, of the Meteorological Office, gave the finishing stroke to the theory by proving that the movements had no connection with either cyclones or with earthquakes, so that the sensitive plant may be considered as out of the list of weather guides, in spite of having been made the subject of an English patent.

"It is a most common observation in the country that a large crop of hips, haws, and holly-berries indicates a severe winter to follow, and it is generally pointed out that nature thus provides winter food for the birds. This, too, is a fallacy.

"Another weather fallacy, for which artists are responsible, is that flashes of lightning take the form of long angular lines of a zig-zag shape* and of which I show you an example taken from a work on the subject. This, when compared with the next view, which is a photograph taken direct from nature, shows that the artist had very little understood the true form of the lightning flash, which consists of numbers of short curves joining each other, something like the course of a river depicted on a map, or in some degree like the outline of a clump of leafy trees seen against the sky. But, as far as I know, there were only two artists whose acute vision saw lightning in anything like its true form. One was Turner, who, long before the time of photography, scratched his lightning flashes with a penknife, making short curved dashes across the picture ; and the other was Nasmyth, the astronomer and engineer, who also saw the lightning in its true form, and duly noted the same, only to be confirmed years afterwards, when it became easy to photograph the lightning flash itself. While on the subject of lightning, I may mention that it is recorded that in one case at least a rheumatic man, who had been confined to bed six weeks, received a shock from a stroke of lightning, jumped from his bed, and ran downstairs completely cured. This is related in the *Gentleman's Magazine* for June, 1820.

"To give an account of all the various ceremonies in savage and civilised countries which have been resorted to for the purpose of changing the course of the weather would be here impossible ; but such rites have a common origin and a common result. They begin in error, and end in failure.

* See also the separate article on this fallacy.

" Patrick Murphy published a popular weather almanac, and his fame is said to have commenced by a lucky hit in one of the earlier issues by which he indicated which would be the coldest day of the year. There is a copy of this almanac for 1838 in the library of the Society, and some former owner has evidently taken the trouble to pencil in the actual weather opposite to that predicted. There were, according to this annotation, 89 incorrect forecasts, 91 doubtful, and the rest correct.

" This Patrick Murphy was not a mere charlatan. He had a system, and though he differed from Sir Isaac Newton and the Royal Astronomical Society, he gave much study and research to the subject of meteorology—as shown by his various books. There was an Astro-Meteorological Society as late as 1861, and we have some numbers of its ' Records ' in our library.

" Next comes the subject of weather prophets as distinguished from mere almanac makers ; and who profess, sometimes for pelf, at other times for honour and glory, to predict the weather for any future date. These are always arising, and they do not lack a certain number of followers, who, possessing a large angle of credence, duly trumpet forth the successes of their chiefs, when they are so fortunate as to make any. The stock-in-trade of a prophet is of a slender and cheap description. He must have an inventive mind, a store of self-confidence, an insensibility to ridicule, and, above all, a keen memory for his successes and a prompt forgetfulness of his failures. He should by choice have a theory, and this should be of the elastic order, so that if a predicted event does not punctually occur, he will be ready with a sort of codicil to amend it. Hence we find that the firing of guns has been cited as a sufficient reason for falsifying a weather prediction ; and railways,* too, are said to have an adverse influence, one author (not a prophet) telling us that they may be considered as ' large winnowing machines, perpetually fanning and agitating the air with prodigious power, ploughing the air, as it were, and causing waves of vast extent, which, invisibly enlarging like the waves of the ocean, probably meet each other, clash, and produce modified effects, as resultants from adverse motions.'

* ' Wire-less ' is now accused !

" A Spanish peasant whom I heard of in Andalusia, and who had the reputation of a weather prophet, wisely said, if you want to know the weather for to-morrow, ask me early in the morning. The Indian weather prophets who made a failure had to be silent altogether for the rest of their lives ; and this causes us to regret that some of our own seers were not born in that distant land.

" As to the so-called weather forecasts, they only come under the title of this paper when they fail, and as eight out of ten are said to be correct, I shall only say that they are honest attempts on the part of civilised governments to warn their people as far as possible against the march of known disturbances. I could wish that the term ' weather indications ' or ' indicated weather ' had been adopted, so as to make this plain to all, and that oftener, when the signs were vague, we had the simple announcement of no change indicated.

" The director of this system so well known to us, and who is playfully called the ' Clerk of the Weather,' sometimes receives valuable hints, even from children ; and I must quote one such communication.

" ' Please, Mr. Clerk of the Weather, tell the rain, snow, and hail to stop for the afternoon, and rain in the night.'

" I may conclude this section by saying that it is a great fallacy to suppose that there is such a thing as a weather prophet. All the great authorities agree that in the present state of our knowledge no human being can correctly predict the weather, even for a week to come.

" And now we must consider a class of weather fallacies of which the victims can only excite in a well-regulated mind feelings of sadness and compassion, rather than the ridicule to which at first sight they seem more naturally entitled. I mean those weather prophets in whom the delicate mechanism of the mind is touched by disorder or decay, even if it has not already fallen under the stroke of complete dementia, and who believe that they can not only foresee the weather, but, by an effort of their own minds, control the elements and compel the clouds.

" Now, as this malady of the mind is not incurable, I will venture to offer a practical suggestion, and would recommend these patients who have nursed themselves into the belief that they possess the keys of the weather, to seek the hilltop on a summer afternoon—the air and exercise

will do them good—and watch the fine fleeces of cumulus cloud as they sail majestically across the sky, each with its attendant shadow below. Let the patient concentrate his attention upon one single feathery cloud, and try by the exertion of his utmost force of will to make it pause for a moment in its career; and, if he fails—'as fail full well he may'—then let him banish from his mind for ever the idea that he can by his own will dominate the whole firmament. And if he has ever gone into print upon the subject, let him go home, and, like Prospero, his prototype, say—

"'Deeper than ever plummet sounded,
I'll drown my book,'

and so save the world from the trouble of investigating much pure nonsense. To these sufferers I can only repeat the words of one of our own kings to the last man he touched for the evil, 'I wish you better health and more sense.'

"I must be forgiven for having made only a selection from the vast catalogue of fallacies which have accumulated about the subject, and I must continue to regret that there are still people who are ready to believe that the saints' days rule the weather, that the sun puts out the fire,* that warm water freezes sooner than cold,* or that a man is a prophet because he says so himself.

"This Society is clearing the ground of many weeds, and already the fallacy of the 'equinoctial' gales has been exploded (by Mr. Scott),† while the churchyard ghost of the supposed fatal 'green Christmas' has been most effectually laid by a recent statistical paper by Mr. Dines.

"Someone may ask, after all this clearing away of fallacies: What have we left? and I would venture to refer him to all the patient work which is being done in various countries, and by which a real Science of Meteorology is being slowly built up, while to the outdoor weather student I would offer this consoling reflection: There is still the sky."

[Mr. Inwards' address ends here.]

"Meteorological experts state that, despite an old belief, having two full moons in a month, as we had in July, does not indicate wet weather.

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* See also the separate article on these.

† "The Equinoctial Gales. Do they occur in the British Isles?" By R. H. Scott, in Vol. x., p. 236 (1884), of the *Quarterly Journal* of the Royal Met. Society.

" ' About every two and a half years we get two full moons in a month,' said an official of Greenwich Observatory yesterday. ' In the wettest February we have had—1885—there was no full moon. The weather in July, 1918, when there was only one full moon, was worse than that of last month and equally wet.' "

" The weather is ruled by the moon, so they say,
And we find that the saying is true.
For at Bala it rains when the moon's at the full,
And it rains when the moon's at the new ;
When the moon's at the quarter, then down comes the rain,
At the half it's no better I ween.
When it's at the three-quarters it's at it again,
And mostly it rains in between."

Bishop Walsham How.

Vide pp. 97, 98, 100, 101 and 104, *Discovery*, by Sir Richard Gregory, D.Sc., and an article by H. Munro Fox, pp. 237-8, *Nature*, Feb. 23, 1922.

That if it Rain on St. Swithin's Day (July 15) it will also do so on the following Forty Days

The French have two similar proverbs :—

" *S'il pleut le jour de St. Médard* (June 8), *il pleut quarante jours plus tard* " ; and " *S'il pleut le jour de St. Gervais* (June 19), *il pleut quarante jours après*."

At p. 22 (the Calendar) of the *Teachers' Prayer Book* (1882), we have the following : " July 15. *Swithun, Bishop of Winchester, Translation.*—Bishop (838-862) at the beginning of the monastic reforms, and the increase of the authority of Rome, which led to the struggle under Dunstan in the next century. He was buried, by his own desire, outside the Cathedral, where men might walk over his grave [that the ' sweet rain of heaven might fall upon his grave.' —Dr. Brewer]. After canonisation in 912, his remains were translated to a shrine in the Cathedral ; and, according to the legend, the saint showed his anger by a rain which stopped the work for forty days. Hence the common belief that rain on St. Swithun's day presages a continued rain of forty days."

Public Opinion of July 20, 1894, had :—

"Sunday was St. Swithin's Day, and a good deal of rain fell in the country. In connection with the popular belief concerning St. Swithin's Day and the weather immediately following, the annexed statement, which was collated in 1861 from the observations at Greenwich for the twenty years preceding, will prove of interest at the present time. St. Swithin's Day was wet in 1841, and there were 23 rainy days up to August 24 ; in 1845, 26 rainy days ; in 1851, 14 rainy days ; in 1853, 18 rainy days ; in 1854, 16 rainy days ; and in 1856, 14 rainy days. In 1842 and the following years St. Swithin's Day was dry, and the result was : In 1842, 12 rainy days ; 1843, 22 rainy days ; in 1844, 20 rainy days ; in 1846, 21 rainy days ; in 1847, 17 rainy days ; in 1848, 31 rainy days ; in 1849, 20 rainy days ; in 1850, 17 rainy days ; in 1852, 19 rainy days ; in 1855, 18 rainy days ; in 1857, 14 rainy days ; in 1858, 14 rainy days ; in 1859, 13 rainy days ; and in 1860, 29 rainy days. It thus appears from the average of the foregoing twenty years that the greatest number of rainy days after St. Swithin's Day occurred when July 15 was dry."

From the above statistics we find that on six occasions St. Swithin's Day was wet, and the *average* number of rainy days (up to August 24) which followed was $18\frac{1}{2}$. In the remaining 14 years St. Swithin's Day was dry, and the *average* number of rainy days which followed was $19\frac{1}{14}$.

The maximum number of rainy days was 31 (not 40, as the fallacy has it !), and this occurred in 1848, when St. Swithin's Day was *dry !*

"Facts are stubborn things, and some figures, culled from documents at the Meteorological Office, prove very illuminating in this connection. The following table shows the rainfall in London in inches for the twenty-four hours included in July 15 for the years stated :—

1906.	1907.	1908.	1909.	1910.	1911.	1912.
0·02	nil	0·09	0·14	nil	nil	nil

For the forty days following July 15 in the years 1906, 1908 and 1909, when there was rain on St. Swithin's Day, as shown above, the rainfall was as follows, the large number of "nil" entries conclusively disproving the legend of forty days' consecutive rain :—

1906.

July.	Rain in inches.	July.	Rain in inches.	Aug.	Rain in inches.	Aug.	Rain in inches.
16	0·25	27	0·28	5	nil	15	nil
17	nil	28	nil	6	nil	16	nil
18	nil	29	nil	7	nil	17	nil
19	nil	30	0·26	8	nil	18	0·02
20	nil	31	0·01	9	nil	19	0·37
21	nil	Aug.		10	nil	20	0·04
22	0·02	1	0·25	11	nil	21	nil
23	0·03	2	nil	12	nil	22	0·20
24	0·05	3	nil	13	nil	23	nil
25	0·02	4	nil	14	nil	24	nil
26	0·06						

1908.

July.	Rain in inches.	July.	Rain in inches.	Aug.	Rain in inches.	Aug.	Rain in inches.
16	0·75	27	nil	5	0·09	15	nil
17	0·31	28	nil	6	nil	16	nil
18	0·07	29	nil	7	nil	17	nil
19	nil	30	nil	8	nil	18	nil
20	nil	31	nil	9	nil	19	nil
21	nil	Aug.		10	0·08	20	0·40
22	nil	1	nil	11	nil	21	0·02
23	nil	2	nil	12	0·05	22	0·08
24	nil	3	nil	13	nil	23	0·78
25	nil	4	nil	14	nil	24	0·08
26	nil						

1909.

July.	Rain in inches.	July.	Rain in inches.	Aug.	Rain in inches.	Aug.	Rain in inches.
16	0·25	27	0·88	5	nil	15	nil
17	nil	28	nil	6	nil	16	0·02
18	nil	29	nil	7	nil	17	0·37
19	nil	30	0·26	8	nil	18	0·04
20	nil	31	0·01	9	nil	19	nil
21	nil	Aug.		10	nil	20	0·20
22	0·02	1	0·25	11	nil	21	nil
23	0·03	2	nil	12	nil	22	nil
24	0·05	3	nil	13	nil	23	0·05
25	0·02	4	nil	14	nil	24	0·33
26	0·06						

—*Daily Telegraph*, July 16, 1913.

That when the Horns of the Moon point Upwards there will be a dry period

The absurd idea and explanation is that when the ' horns ' point upwards they form a cup and so retain the water which otherwise would fall upon the Earth. The Moon is 239,000 miles from the Earth. The atmosphere of the Earth is about 100 miles thick and the whole of our weather effects are produced within that 100 miles, so unless the Moon could send us radiant heat as the Sun does it could have little or no effect on our weather.

" Meteorologists are prepared to adopt any rule or relationship which is of assistance in preparing their weather forecasts ; and the fact that they take no account of lunar phases or the direction of the Moon's horns—which can be determined many years in advance for any latitude on the Earth—shows that lunar influence has not yet been brought within the sphere of practical science."—Sir Richard Gregory, D.Sc., *Discovery*, p. 101.

Curious to relate in New Zealand the argument is : " The canoe is full of water, we shall have rain " !

That a day of exceptional visibility is more likely to be followed by rain than a day of low visibility

" Visibility as a Sign of Coming Rain.—Exceptional visibility as a sign of coming rain is discussed in the *Meteorological Magazine* for October from observations made by Mr. W. H. Pick of the Meteorological Office, Air Ministry, at Cranwell, Lincoln. Observations were taken on 518 days from April 1, 1920, to August 31, 1921. Visibility is observed hourly, and the classification of a day with visibility of 21 miles or more is a day on which such visibility was observed at one or more of the hours from 9 h. to 17 h., and similarly with a visibility of 13 miles, the latter being naturally included in the visibility of 21 miles or more. The days with rain between the period of visibility and 7 h. on the following morning are also tabulated. An examination of the data is said to show that, so far as Cranwell is concerned, there is no evidence that a day of exceptional visibility is more likely to be followed by rain than a day of low visibility ; the author says, rather the reverse. Only one-third of the days with visibility 21 miles or more were followed by rain, while with visibility less than 13 miles

one-half of the days were followed by rain. A discussion on visibility at a meeting of the Royal Meteorological Society last December has helped much to an understanding of the subject. Exceptional visibility or 'nearness' is by no means a common feature, and for a test as a sign of coming rain, it seems to require different handling from that given by the author."—*Nature*, Nov. 25, 1922, p. 713.

That thunder is produced by the atmosphere closing up after being cleaved by lightning

> *" Methinks King Richard and myself should meet*
> *With no less terror than the elements*
> *Of fire and water, when their thundering shock*
> *At meeting tears the cloudy cheeks of heaven."*
> King Richard II., III., iii., 52.

The above was the explanation found, about 50 years ago, in such books as Brewer's *Guide to Science*, and *The Reason Why*, and even the *Parents' Book* (1913), though giving the initial part of the correct explanation, still clings to the atmosphere going 'back with a rush.'

A flash of lightning takes place with extreme rapidity; far more so than appears to the eye to be the case, because when we see a flash the image of it probably persists on our retina for about $\frac{1}{7}$ of a second, which is far longer than the duration of the flash. In this minute fraction of time an exceedingly high temperature is produced, which causes a great increase in the volume of air in the immediate neighbourhood of the path of the discharge. This causes a powerful wave of compression in the air, and when this reaches our ears we experience what we call the noise of an explosion, for thunder is just as much an explosion as the explosion of a high explosive is, only in the latter case, in addition to the excessively high temperature causing expansion of the air, there is an actual generation of a large quantity of gas by chemical means which adds to the wave of compression, or, in other words, produces a greater explosion.

The 'roll' or *roulement* of thunder is due to the sound being reflected *not* from the visible clouds, but from the various surfaces which separate air at different temperatures, for the atmosphere is far from being of uniform temperature. It is stratified; walls of warm air alternating with walls of cooler air. This matter was fully investigated by John Tyndall, F.R.S., at the South Foreland, and is recorded in his

book *On Sound*. The ' roll ' is also partly due to the different distances that the different parts of any one discharge are from the listener.

That Explosions produced by firing big guns, or other means, bring down heavy rain

" If Talbot do but thunder, rain will follow."
I. Henry VI., III., ii., 59.

On Feb. 23, 1915, Sir Richard Gregory, D.Sc., F.R.A.S., gave an address on *Science in the Daily Press* to the Circle of Scientific, Technical and Commercial Journalists, in which he said : " Many educated people believe that rain follows great battles, the general opinion being that the noise of the guns or the burning of the gunpowder in some way affects the clouds, and causes them to precipitate their moisture. But as the belief that great battles cause rain was held long before the invention of gunpowder, and is, indeed, mentioned by Plutarch, it is evident that the explanation is unsatisfactory, and only presents an ancient theory in modern terms."

" So persistent and widespread is the fallacy, that as recently as the year 1911 a member of the House of Commons asked the First Lord of the Admiralty in Parliament ' whether he would arrange for the fleet to carry out their heavy gun-firing practice round the coast at some other period of the year than in the middle of the harvest-time, when the resulting heavy rain may cause serious loss to the farming community.' The reply was that ' There is no evidence that the firing causes heavy rain,' but this only meets belief with denial. Though the argument is not strictly scientific, perhaps the most convincing form of reply to those who profess to believe, or do believe, in the efficacy of gunfiring to produce rain, is to point out that the firing of big guns is carried on at Shoeburyness more frequently than at any other point on the coast, yet the mean rainfall at Shoeburyness, and on the coast of Essex generally, is the lowest in the British Isles."

" So long is the arm of coincidence and so infinite are the resources of our climate that, in the absence of valid physical proof, it is doubtful whether, even in the event of similar conditions continuing for another three years (or the duration of the war), meteorologists would be convinced that the ' frightfulness ' of man can influence the course of the elements."—*Nature*, Jan. 10, 1918, p. 371.

There was a terrific explosion of many tons of T.N.T. at Silvertown, London, on Jan. 19, 1917, which was heard in one direction for 100 miles, yet no rain has fallen in London since, and it is now Jan. 28, 1917.

In *Rapports sur les Travaux de la Station de Climatologie agricole de Juvisy pendant les Années 1915 et 1916*, M. Camille Flammarion, Directeur de la Station, concludes that "in spite of the frightful intensity of the cannonades, they have exerted no influence on the rainfall in the region of Paris."

Another paragraph on the subject appears at p. 10 of *Nature* of Mar. 7, 1918, referring to an article *Gunfire in France, Rainfall in England*, by Dr. H. R. Mill, in the Feb. issue of *Symon's Meteorological Magazine*.

A question on the effect of gunfire on rainfall was asked in *Notes and Queries* of Jan. 1, 1916, at p. 10, and resulted in many replies during the period Jan.-Aug., 1916.

Vide articles on meteorology in *Ency. Brit.*, 1911 ed., pp. 289-90, *sub* 'Formation of Rain.'

Mr. Robt. Pierpoint quoted in *Notes and Queries* of July 8, 1916, from a letter of Mr. D. W. Horner, F.R.M.S., to the *Daily Express* [no date given], in which Mr. Horner stated, "The best evidence in favour of the theory that the abnormal gun fire in Western Europe has caused excessive rainfall is the fact that at Greenwich the rainfall for the 12 months ending April 30 last was 32·17 ins., more than 8 ins. above the average for the period 1841-1905." Mr. Pierpoint very rightly comments on this statement thus, "Mr. Horner shows about 33 per cent. above the given average, but does any one of the years 1841-1913 show a rainfall of or about 32·17 ins.?" Naturally most of the actual yearly rainfalls are either above or below the average, hence the fact that any one year was above the average means very little.

Mr. G. H. Palmer wrote (from Heywood Park, White Waltham, Berks), in *Notes and Queries* of July 22, 1916, at p. 174, "I have registered the rainfall in this immediate neighbourhood for 33 years, and in that time I have registered a total of 30 ins. and over on four occasions, viz., 1891, 30·09 in.; 1903, 39·34 in.; 1912, 31·65 in.; 1915, 30·55 in."

Mr. Tom Jones wrote in *Notes and Queries* of Aug. 5, 1916, at p. 113, ". . . According to *Whitaker's Almanack*, 1916, the rainfall in London from Nov., 1914 to Oct., 1915, was 33·69 ins., being 9·3 ins. above the average. But excessive

rainfall is recorded in times of peace. From Nov., 1878, to Oct., 1879, the fall was 36·65 ins., being 11·63 ins. above the average."

"Lecturing before the members of the Meteorological Society, at the offices of the society in Victoria Street, S.W., last evening, on 'Battle Weather in Western Europe,' Mr. Charles Harding said the prolonged persistence of heavy rains of late had inclined many to believe that the downpour was to a certain extent associated with the heavy gun firing over Flanders and Northern France. With the conditions which were known to meteorologists as anti-cyclonic, when the whole character of the weather was opposed to rain, no amount of explosion or concussion in the air could produce rains in anything like measurable quantity. With cyclonic conditions, however, when rain was normal, it was quite conceivable that the rains could be augmented by the extraordinary gun firing which had been so persistent over the whole Western battlegrounds."—*Daily Telegraph*, June 17, 1915.

"Attempts have on many previous occasions been made to produce rain by artificial means, but the results have been uniformly unsuccessful."—Dr. Harold Jeffreys, *Nature*, Nov. 3, 1921, p. 313. The discharge of liquid air from an aeroplane has also been tried without effect.

"ELECTRICAL RAIN-MAKING.—The Committee appointed by the N.S.W. Premier to inquire into Mr. Balsillie's proposals for causing rain by electricity has now reported. The essential features of the proposal were the use of an electrically charged, metal-coated captive balloon, the suspending of a Röntgen-ray tube from it, and the combination of the electrically charged body and the Röntgen rays. The Committee reports that after experiments it was not satisfactorily established that Mr. Balsillie had succeeded in making any definite advance towards attaining practical results, but recommends further investigation of the subject, with a view to the carrying out of open-air experiments in New South Wales."—*Sydney Evening News*.—*Electrical Review*, Feb. 4, 1916, p. 150.

Benvenuto Cellini records, at p. 236 of his *Life*, that he stopped a heavy downpour of rain by firing heavy artillery at rain clouds!

Vide *Nature*, No. 2,699. of 1921 ; *Discovery*, by Sir Richard Gregory, p. 109.

That wind blows from a place of high barometric pressure to one of low

Nothing seems more natural than that the above should be true, and of the many surprises the author has had in connection with this work perhaps none was greater than when he learned from an engineer that this, too, is a fallacy. He called for evidence, and his friend lent him the Jan., 1918, issue of the *Aeronautical Journal*, containing a paper by the well known meteorologist, W. H. Dines, F.R.S., F.R.Met.S., F.Ae.S., at p. 26 of which he says, " At first sight it would appear as though the wind would blow from places of high to places of low barometer, but a little consideration shows that such conditions could only be very shortlived. For if air flowed into a low pressure area to any appreciable extent it would only take a time to be measured in minutes for the low pressure area to be filled up by the incoming air and to be replaced by a high pressure area. Observational facts make it perfectly clear that on the average, at the height of a few thousand feet, the wind blows along the line of places where the pressure is equal, along the lines which on a weather chart are called isobars, lines, that is, of equal pressure. Also the velocity is proportional to the barometric gradient, that is, to the change in the height of the barometer along a line at right angles to the isobar.

" The reason for this lies in the rotation of the earth on its axis, and a comparatively simple mathematical process enables us to calculate the precise velocity of the wind that should correspond to a given barometer gradient in any place. The wind coinciding in direction with the isobar and with a velocity computed by the formula is called the ' gradient wind,' and if the wind be asked for in the strata commonly used by aeroplanes, the best answer is to give the gradient wind. For straight isobars the formula is $y = 2_{\omega} v \sin \phi$, where y is the barometric gradient, ω the angular rotation of the earth, v the velocity of the wind and ϕ the latitude of the place.

" It has been already stated that it is an observational fact that on the average the wind at 3,000 ft. does agree with the gradient wind, but it cannot be denied that in each individual case the agreement does not appear to be precise. It seems likely in view of recent suggestions that on certain parts of the weather chart the agreement cannot be expected to be precise, but, on the other hand, the discrepancies which appear are such that they might quite reasonably be put down to observa-

tional error. Irregularities of pressure occur which are not shown by the barometric data of stations lying 100 miles or so apart from each other, and it may well be that the gradient wind and the true wind do really agree, but that the former cannot be calculated from the chart with sufficient nicety of detail to make the precise agreement plain."

In *Air* for August, 1918, at p. 111, Mr. William R. Blair had an article on *Physical Properties and Dynamics of the Atmosphere*, in which he dealt with the same matter, saying (p. 117), " Because of the earth's rotation, air (or other matter) in horizontal motion over the earth's surface is acted on by a deflecting force, to the right in the northern hemisphere, to the left in the southern hemisphere.

". . . If, then, a current of air is flowing along a straight line on the earth's surface (*i.e.*, along a great circle) in a frictionless manner at a uniform speed, this deflective influence due to the earth's rotation must be balanced by an equal and opposite force. This last is due to the pressure gradient in the atmosphere, which is by definition perpendicular to the isobars. It follows, then, that the current of the air must be along a path exactly at right angles to the gradient, that is parallel to the isobars."

That a cyclone is a warm column of rising air with spirally inflowing winds at its base

For an article on this subject by 'J. S. D.', see *Nature*, of Jan. 2, 1919, at p. 348, from which the following is excerpt :—

" Until some twenty years ago meteorology was regarded as an elementary science founded on theories so simple that they might be taken as self-evident. Thus the cyclone was looked upon as a warm column of rising air with spirally inflowing winds at its base ; the anti-cyclone, conversely, contained a cold core of descending air. Now we know that the opposite is in reality the truth ; the cyclone has a cold core, the anti-cyclone a warm one. Another theory of equal simplicity and perhaps of even greater antiquity explained the general circulation of winds around the globe. It was argued that solar heating made the equator very much warmer than the poles ; therefore there must be a rising current at the equator, a poleward flow of air in the upper layers of the atmosphere, a descending current in polar regions, and an equatorial flow in the lower layers. To

question the validity of such a theory would have been regarded as almost an impertinence.

" In a recent paper Hildebrandsson has dealt in a comprehensive manner with this question of world circulation, avoiding preconceived theories, but collecting all available information on the subject. Incidentally he puts forward several very cogent reasons why the simple theory outlined above is untenable, though there can be few meteorologists of the present day who regard it at all seriously."

That the North-East wind is the coldest in England

It is the North-west wind which is the coldest, as will be found on reference to the reports of the Royal Meteorological Society, especially one about April, 1913.

That moist air is usually accompanied by a low barometric pressure

Nature, April 27, 1916, reporting a lecture by Sir Napier Shaw, D.Sc., F.R.S. :—" . . . Mr. Dines has recently examined the correlation between the humidity of the troposphere [the lower 10 kilometres of the atmosphere] and the pressure at the surface. The coefficient [of correlation] is quite insignificant ; there is no relation between moist air and low pressure on the map."

GENERAL MISINFORMATION

That Cannibals eat Human Flesh Raw

On this subject Capt. S. L. Hinde said at a meeting of the British Association at Ipswich, in September, 1895: "It is remarkable that, contrary to an ignorant and yet very generally accepted theory, the negro man-eater never eats flesh raw, and certainly takes human flesh as food purely and simply."

The whole report being interesting, we give it in full as it appeared in the *Globe* of September 16, 1895:—

"Cannibalism on the Congo.

"Speaking at the British Association at Ipswich on Saturday, Captain S. L. Hinde, who has been travelling and fighting for some years in the Congo basin, said that almost all the races on the Congo practise cannibalism, and, though in some parts it is prevented by the presence of white civilisation, in others it seems to be on the increase. An extensive traffic in human flesh prevails in many districts, slaves being kept and sold as an article of food. The different tribes have various and horrible methods of preparing the flesh for eating; in some instances, before the death of the victim, certain tribes of the Bangala race themselves acknowledge that they break the arms and legs of the victim, and place the body thus mutilated and still living in water for two or three days, on the supposition that this pre-mortem treatment renders the flesh more palatable. There are also distinct tribal preferences for various parts of the body, and it is remarkable that, contrary to an ignorant yet very generally accepted theory, the negro man-eater never eats flesh raw, and certainly takes human flesh as food purely and simply, and not from any religious or superstitious reasons. In the country of the Balétéla one saw neither grey-haired persons, halt, maimed, nor blind. Even parents were eaten by their children on the approach of the least sign of old age. Under such circumstances the Balétéla were a splendid race. After a fight the native camp-followers of his expedition invariably ate up all the dead, leaving absolutely nothing for the jackals. In this way they undoubtedly

saved the expedition from many an epidemic. With regard to the pygmies, he said their average height was under 4 ft., and it was as difficult to detect their presence in the forest as it would be to find a mouse in a cornfield. They were a nomadic race, and, being hunters, followed the game in its migration through the forest according to the season. They were courageous, pugnacious, and had an intimate knowledge of poisons. Death succeeded in from three to ten minutes after a scratch was made by one of their tiny poisoned arrows.

"Mr. Elworthy said he appeared in the character of 'devil's advocate,' and thought there was something to be said in favour of cannibalism. Underlying it was the primeval idea that the body imbibed the properties of that which it ate. Upon that idea—and with all possible reverence he said it—was founded one of the most solemn of our Christian rites. In one part of France even now the last of the harvest corn was baked into a loaf made in the form of a human figure. This was supposed to represent the spirit of the corn—the spirit of vegetation, reproduction, fertility—and was broken up, distributed among the villagers, and eaten."

Apropos of this subject may we be allowed to refer to the story of the man with a 'cork' leg who was shipwrecked on a cannibal island? He saw preparations being made for the feast of which he was to be the *pièce de résistance*, and with commendable presence of mind he asked the chief (? *chef*) if he did not think it would be as well if he tasted a sample first. The chief thought it an excellent suggestion, and so the man held up his cork* leg while a sample was cut from it. The chief decided the man was too old, tough and tasteless, and so his life was spared.

We are also reminded of the story that before the first Bishop of New Zealand left England, Sydney Smith, in taking leave, affected to impress upon his friend the dangers of his mission. "You will find," he said, "in preaching to cannibals that their attention, instead of being occupied by the spirit, will be concentrated on the flesh; for I am told that they never breakfast without a cold missionary on the sideboard." In shaking hands with the new prelate as he was leaving the house, Smith added, "Good-bye. We shall never meet

* *Vide* the P.F. *re* Cork Legs.

again; but let us hope that you may thoroughly disagree with the savage that eats you" !

That it is possible to Cut any Name with your Skates on the Ice when Skating

Now the author feels completely out of his depth, or rather he would be if the ice were to break, for on ice he cannot always control even his 'best leg' sufficiently to 'put it forward'! However, a skating friend, who is also a figure skater, assures him that this is a fallacy, in spite of the advertisement pictures we saw some winters ago in praise of certain lozenges [No, *not* pills this time!] in which a fair skater, the observed of all observers, was marking a complete legend on the ice with her skates.

That a Locomotive Driver Guides the Train as well as Drives it

By the above is meant that the driver can, if he so desire, change from one pair of rails (technically known as the metals) to another. This is a mistake. The driver can go only forward, or backward, or stop his train, or vary its speed. If a train has to change from one pair of rails to another, the *points* have to be suitably set so as to engage with the flanges on the rims of the wheels of the engine and carriages. The control of these points, and also of the signals (semaphores), is in the hands of the man in the signal box, and his is a very responsible position. Automatic signalling is now largely in use.

If a locomotive were placed on a large flat iron floor, the driver would be powerless to cause it to move in a straight or curved line at will, for such engines are entirely without any steering gear such as is possessed by traction-engines, steam-rollers, and motor-cars. The arrangement of the two front wheels on two bell-cranks (instead of on one continuous axle), which is almost universal in the case of motor-cars, is due to the author's great-grandfather, who patented the invention on January 27, 1818, the number of the patent being 4,212. The old gentleman (who also introduced lithography into England) was evidently much before his time, for it was never used commercially until motor-cars came in. Although invented over 100 years ago, the mechanism is well known by the inventor's name as the Ackermann gear.

That one-third of a tumblerful of Whisky is not so Intoxicating if the glass be filled up with Water

"Diluted spirits act less rapidly than neat spirits, but if taken in the same period the remote intoxicating effects will not be appreciably different; of course, the local action on the stomach and liver will be more intense in the case of the neat spirit."—Dr. J. J. Ridge.

That a Cork 'Tall Hat' is made of Cork

When we look inside one of these so-called cork hats we see the surface of a very thin layer of cork, which is used instead of the usual white silk to line the hat, though the latter is not stuck down in the same manner. In either case the main body of the hat is of the same materials, viz., linen, shellac, and silk.

That the so-called Dutch Clocks are made in Holland

"The wooden clocks which we erroneously call 'Dutch' are nearly all made in the Black Forest, and are, indeed, German clocks. The village of Freiburg is in the centre of this manufacture, whence wooden clocks are exported 'to the number,' it is said, 'of 180,000 yearly, under the name of *Dutch clocks*, not only throughout Europe, but even to America and China.' Shakespeare, in *Love's Labour Lost*, Act iii., scene i., speaks of these clocks rightly, thus:—

"'A woman, that is like a German clock,
Still a-repairing, ever out of frame,
And never going aright.'"

J. Timbs, F.S.A.

The term 'Dutch' may be a corruption of 'Deutsch,' the German word meaning German.

That being a M.R.C.S. and a L.R.C.P., or a M.B., entitles the practitioner to prefix "Dr." to his Name on his Card and Plate

No title is more incorrectly used than that of "Doctor." The doctorate of medicine was one of the first to be instituted, and hence the terms "doctor" and "medical man," or "physician" are commonly used as synonyms. This is not strictly correct, and it is worse to apply the title of "doctor" to a surgeon, though this is most commonly done.

The Royal College of Surgeons issues two diplomas :—

(1) To Fellows of the R.C.S. [F.R.C.S.], and
(2) To Members of the R.C.S. [M.R.C.S.],

the former being the higher qualification.

The Royal College of Physicians issues three diplomas :—

(1) Fellow of the R.C.P. [F.R.C.P.],
(2) Member of the R.C.P. [M.R.C.P.], and
(3) Licentiate of the R.C.P. [L.R.C.P.],

the Fellowship ranking higher than the Membership, and the Membership higher than the Licentiateship.

None of the above five diplomas, or any other like them issued by other societies, confers the title of "Doctor" upon the individual holding it. The doctorate of medicine, like the doctorates in all the other faculties, is a degree conferred by a University either *honoris causâ*, or on the result of an examination [as is usually the case with *all* the degrees at the University of London]. When a candidate has obtained any one of the doctorates (or the B.A., B.Sc., etc., degrees) by examination, he is said to have *graduated* at such and such a University, and in such and such a faculty. There are doctorates of Divinity, Medicine, Law, Engineering Science, Music, Philosophy, Literature, etc., and anyone having gained one or more of these is entitled to call himself "Doctor Dash," and to be addressed as such.

Hence we see that while *all* the medical men and surgeons on the British Medical Register are *qualified* practitioners, only a small percentage of them have *graduated* M.D. or M.B. By courtesy a person who holds the M.B. degree is addressed as "Doctor," but it would be bad taste for him to call himself Doctor, or to have that title on his card or plate.

That Indian Ink comes from India

Indian ink does not come from India, and never did. It came originally from China, and so should be called Chinese ink, as, indeed, it is in France. The Red Indian is not red; when washed—but that is seldom—his skin is brown. According to *Harms. Ency.* ('American Indians') the name arose "from the original delusion of Columbus, who supposed that the land discovered by him was the India, and its inhabitants the Indians of the Eastern hemisphere." Although a nigger should, according to his name, be a black man, he is not black, but only a dark shade of brown.

That there is a Cavity in Nelson's Cocked Hat on his Statue in Trafalgar Square, in which there are Pewter Pots, Coins, etc.

This idea may have arisen from the practice of putting newspapers and coins under some foundation stones when publicly laid. When the steeple-jack, Harrison, was making the arrangements for decorating the Nelson Column on Trafalgar Day (October 21, 1896), he was asked about this matter and said there were not any things of that character up there.

That the celebrated Chinese Rice-paper used for paintings by the Chinese and Japanese is made from any part of the Rice Plant

The so-called ' rice-paper ' used by Japanese and Chinese artists is certainly not made from rice or the rice plant, and it is not even paper in the usual acceptance of the word, for it is pith. The pith of the *Fatsia papyrifera* is from one to one and a half inches in diameter, and it is sliced into thin rolls by a knife as broad as the roll is long, in a manner similar to that in which wood veneer is made. The sheet is then unrolled, dried flat under pressure, and is then ready for use. Anyone who has examined a sheet of this pith will at once recognise that it is unsuitable for making cigarette papers, being too thick and delicate for the purpose.

Paper can be and is made from the straw of rice, but it is a very different article from that which is known erroneously as rice-paper.

That the Albert Hall, London, is Circular in Plan

It is not ; it is elliptical or oval, being longer from north to south than from east to west. This is noticeably so if the area be looked at carefully from the gallery. It may be seen by referring to a plan of the building, such as may be found on the ten-inch ordnance map of London.

That a Country Dance has any special reference to the Country

The term is a corruption of ' contra-dance,' from Latin, *contra*, opposite, and means a dance in which the partners are arranged in lines facing one another.

That Camels' Hair Brushes are made from the Hair of Camels

The hair of camels is used for making very fine fabrics, especially shawls, but also carpets and tent-cloths. It is

also used for mixing with silk, but it is *not* used for making the brushes, called "camels' hair brushes," used by engineers, architects, and artists, these being made of hair from the tails of Russian and Siberian squirrels.

That Briar Pipes are made from the Roots of Sweet-briar

Sweet-briar (*Rosa rubiginosa*) is a variety of rose, and its roots are *not* used for the manufacture of pipes, because for one reason they are too small for the purpose.

Briar pipes are made out of the roots of a white heath (*Erica arborea*), which grows to a considerable size, and is cultivated in South of France for the purpose. The name is derived from the French "*bruyère*," dialect "*brière*," meaning heath. The word briar by itself has a rather indefinite meaning, being defined as "a prickly plant or shrub in general; specifically, the sweet-briar or green brier." The latter is *Smilax rotundifolia*, a greenish-yellow climbing plant with prickly stem and thick leaves.

That a Policeman's Activity in Prosecuting Cases affects his Promotion

This fallacy was prominently and authoritatively dealt with before the Royal Commission on the working of the Police regulations, and was reported at p. 9 of the *Daily Telegraph* of July 18, 1906.

Sir Edward Henry, then the Chief Commissioner of Police, was being examined, and made these remarks :—

"*I have often seen it stated that a constable's activity in prosecuting cases affects his promotion. This is quite inaccurate.* A constable's activity or otherwise with regard to arresting or prosecuting persons is not taken into account at all in considering the question of promotion. Our rule is that no promotion is given except as the result of an examination held at New Scotland Yard, written and oral, by an examining board consisting of a chief constable and four superintendents, supplemented by an examination independently held by the Civil Service Commissioners. During the time that I have been Commissioner I know of only two cases in which promotion was given without such examination, and in one of these the candidate passed in his professional examination but failed before the Civil Service Commissioners. The number of promotions each year would

aggregate about 400. Every constable with five years' or more blameless service to his credit is eligible for promotion, and can apply to be permitted to compete at these examinations. There is no special record kept of the cases in which constables are concerned. If I wanted to know what work in connection with cases any individual of the force had done I should have to call for a very lengthy and tedious search to be made amongst the registers in order to arrive at the information. *Our rule is well known to all the men engaged, and no inducement of any sort or kind is held out to them to be unduly active in relation to arrests or prosecutions of individuals.* On the other hand, it is well recognised that the bringing of charges involves inconvenience and loss of rest to the officer concerned."

That Venetian Glass is all made in Venice

It is nearly all made in Murano, near Venice, and all the modern glass-works are there. Mr. C. E. Clark points out that the peculiar sand required for its manufacture is not found at Venice.

That Dresden China is made in Dresden

To begin with, the word 'china' is usually incorrectly used in place of the word 'porcelain.' We should say "Dresden porcelain," "Royal Worcester porcelain," "Sèvres porcelain," etc., for 'china' is strictly applicable only to porcelain made in China. Well, Dresden porcelain is made at the royal factory of Meissen, near Dresden, in Saxony, and it was first made there in the year 1707. The early makes are commonly known as "*vieux Saxe.*"

That Axminster, Brussels, and Wilton Carpets are all made in Axminster, Brussels, and Wilton respectively

All these names have been applied to the particular makes of carpet which they imply because *originally* these particular types came from the towns after which they are still named. There are numbers of similar instances in connection with other manufactured goods.

That a Quart Bottle has a Capacity of Two Pints

This is a fallacy many a fraudulent tradesman is only too anxious to keep up. In the Cape it is (or used to be

when the author was there in 1886) quite as usual to hear the words, ' six bottles one gallon,' as it is in England to hear " eight pints one gallon." The bottles referred to in the Cape are the same that are known in England as ' quart bottles,' therefore each holds only one and one-third pint, instead of two, as the name quart leads us to suppose. Note this too: a Winchester quart = an Old English quart = $57\frac{3}{4}$ cubic inches, but an Imperial quart = 69·32 (say $69\frac{1}{4}$) cubic inches.

When the simple metrical system of weights and measures is in use in England such inconsistencies as those named will be practically impossible, and fraud based on our confused and gigantic anti-system will be made far more difficult.

That the " Land o' the Leal " means Scotland

Miss L. P. Steele-Hutton, M.A., writes :—

" ' Land o' the Leal ' isn't Scotland, but Heaven ! and though I am Scotch, I admit that it isn't quite the same thing ! "

The *Cyclo. of Names*' explanation is :—

" A mythical land of happiness. Lady Nairne, in her poem of that name, uses it for Heaven, and the use has now become an accepted one."

An account of the poem, and the poem itself, appear at p. 10, *John o' London's Weekly*, Oct. 8, 1921. Lady Nairne was also the author of *Caller Herrin'*.

That the " Heart of Midlothian " means Edinburgh

Miss L. P. Steele-Hutton, M.A., writes :—

" ' Heart of Midlothian ' is not Edinburgh, but the old gaol of that city. Some mere Englishman once, bent on saying something pretty in a public speech about Mr. Gladstone, hoped he would soon return to the ' Heart of Midlothian ' ! "

The *Cyclo. of Names*' reference is :—

" A novel by Sir Walter Scott, published in 1818; so-called from the popular name of the Tolbooth, an Edinburgh prison, demolished in 1817."

The site of this prison in the old portion of Edinburgh was (in 1917) marked by a design formed of the paving blocks near the Municipal Chambers.

That Frankenstein was a Monster as is implied in the phrase, "The monster Frankenstein"

Frankenstein was a romance written by Mrs. Mary Wollstonecraft Shelley and published in 1818. The hero's name was Frankenstein. He was a medical student who created a monstrous and nameless being from materials gathered from tombs and the dissecting rooms. When the creature was complete with bones, muscles, and skin, it acquired life and committed atrocious crimes, including the murdering of the bride of Frankenstein and of his dearest friend. It came to an end in the northern seas.—Tuckerman, *History of English Prose and Fiction*, p. 319.

That Hackney Coaches were so named because they were first made in Hackney, London

This is not so. The word comes in a rather roundabout way from the French, "*haquenée*," an ambling horse. A long account of the derivation is given in the *Cent. Dic., q.v.*

Vide also *Notes and Queries*, 12 S I, 150, 254, 398, 494; 12 S II., 32, 95.

That Meerschaum is Consolidated Sea-Foam

The word is a German one meaning literally 'sea-foam,' but the substance is really a hydrated silicate of magnesium, occurring in fine white clay-like masses. The name refers to the lightness and snow-white colour of the material.

That Tobacco Smoke is a Disinfectant

This is certainly a popular notion if nothing else. Drs. Notter and Firth, in their work on *Hygiene* (7th ed., 1908, p. 341), speak in no uncertain tone on this matter:—

"A bad smell is of importance as indicating the existence and presence of microbes; the mere smell can usually be disguised, removed, or hidden by such deodorants as eau-de-Cologne, camphor, sanitas, or even tobacco smoke; but these would all be useless as a means of removing or destroying the germs which are the cause of the bad-smelling gases."

There is one broad generalisation which will save much misconception on the subject of disinfection, and that is that anything which will kill pathogenic micro-organisms will also kill human life. Hence putting whisky into water

to 'kill the germs' and smoking to disinfect the air are dangerous fallacies, because they give a false sense of security and prevent proper precautions being taken.

"The varying effects of tobacco as a cause of diseased conditions of the mouth were referred to in a speech delivered yesterday by Sir H. T. Butlin, F.R.C.S., at the opening of the International Dental Federation Congress at the Royal College of Surgeons, W.C.

"People whom he had known to smoke cigars and cigarettes from morning to night often had the healthiest mouths. On the other hand, he had seen persons with one patch of disease on that part of the tongue where the smoke impinged; yet they were moderate smokers. It was a question of the susceptibility of the individual."—*Daily Mail*, Aug. 2, 1911.

That Cork Legs are made of Cork

"Bind fast his corky [*e.g.*, dry or withered.—Ed.] arms."—
King Lear; III., vii. 28.

They are made of wood, metal and leather, or a strong form of canvas. The misconception has naturally arisen from the name of the inventor of artificial limbs.—Dr. Cork.

The Rev. Dr. Stevens, writing on Dec. 2, 1907, and Mr. A. B. Morgan on Feb. 11, 1908, both give the foregoing derivation. Dr. Brewer (*Phrase and Fable*) does not mention cork legs, but Mr. C. E. Clark (*The Mistakes We Make*) says the name arose from the fact that nearly all the great manufacturers of such appliances used to be situated in Cork Street, London, W., while *Ency. Brit.*, Vol. VI., p. 402, art. 'Cork,' says, "This is also used for making artificial limbs."

When Rudyard Kipling addressed the medical students at Middlesex Hospital on Oct. 1, 1907, he said, " . . . No change in public opinion will allow you not to attend a patient when you know the man never means to pay you, or protect you from the people who, although perfectly well able to pay, prefer to cadge round a free hospital for their glass eyes or cork legs."

E. Muirhead Little, F.R.C.S., the distinguished orthopœdic surgeon, read a paper on *Cork Legs* before the Casual Club on Nov. 15, 1917, and said that as far as his inquiries went he had not been able to find that artificial legs ever were made of cork. English willow wood is much used.

That a banister is the hand-rail portion of the fencing of stairs

The whole construction is a balustrade, and a banister is *one* of the vertical bars running from the hand-rail to the steps. This refers more particularly to wooden structures. If the balustrade is of stone, and especially if it fences a balcony or terrace, then the vertical members are usually called balusters, or colonets.

That rubber goods are made by melting rubber and pouring it into moulds

The Old Students' Association of the Central Technical [Engineering] College, publish *The Central.* In the December, 1907, issue (Vol. IV., No. 13, pp. 135-151), there is a well-illustrated article under the heading " From Tree to Tyre," by E. W. Lewis, and from pp. 145, 148 and 151, we excerpt the following :—

" *Mastication and Mixing.*—The idea was formerly very widely shared that rubber goods were made by melting rubber and pouring into moulds where it solidified. There is probably little need to refute this idea in the present year of grace ; but, even so, correct notions on this subject seem to be very sparsely distributed. . . . The ' uncured ' sheet may be used for making up various rubber articles, such as tennis-balls, bulbs for syringes and motor-horns, football bladders, and so on, these articles being afterwards vulcanised as such ; or it may be used for making solid articles, such as buffers, by building it up roughly, while warm, to the form of the articles in question, forcing it while in a semi-plastic state into a metal mould, and vulcanising it while still confined in the mould under pressure . . . . Hollow articles, such as balls, are made from two or more pieces of sheet rubber, seamed together by means of rubber solution. A quantity of some substance, which is gasified on heating at the curing temperature, is placed inside the ball, which is then put into a metal mould of the exact shape of the finished article. On heating the mould the uncured rubber is forced out to fit it by the expansion of the inflating substance, and in this shape the cure is completed."

That it is correct to call all rectangular tables square ones

A square is a figure having four equal sides and all its angles right angles. A rectangle also has all its angles

right angles, but its sides are not necessarily all equal. Its opposite sides are equal, and usually one pair of equal sides is greater than the other. Thus a table should be called square only when its four sides are equal and its angles right angles. If the angles are right angles, but the sides not equal, it is a rectangular table.

That the fountains in Trafalgar Square are the result of the water under pressure being emitted directly from an artesian well

The *Times* of Nov. 3, 1908, in reporting a lecture delivered the night before by Mr. Cecil Carus-Wilson at the London Institution on "Underground Water Supply," said Mr. Carus-Wilson corrected the above "erroneous popular idea," and stated that the water was derived from a bore-hole 366 feet deep, being pumped up and used over and over again.

That Monday is the First Day of the Week

This error has, no doubt, arisen from the wording of the fourth commandment, ". . . . Six days shalt thou labour and do all that thou hast to do; but the seventh day is the Sabbath of the Lord thy God . . . ."

Nevertheless Sunday is the first day of the week. The *Cent. Dict.* says, "The name Sunday belongs to the first day of the week on astrological grounds, and has long been so used, from far beyond the Christian era, and far outside of Christian countries."

In the Jewish calendar our Saturday is their Sabbath, or the "seventh day" of the Commandment, and thus our Sunday is the first day of the week.

That the Girls who wear the scarlet cloaks of the "Guards' Home" are Orphans

A letter written by Lieut.-Gen. George H. Moncrieff is conclusive on this point. It was as follows:—

"Sir,—Idle and irresponsible criticism, such as that contained in a letter published in the *Daily Mail* on November 7, scarcely merits the trouble of refuting; but in the interests of the 'Guards' Home' I may as well state briefly that 'the painfully conspicuous red cloaks' are proudly regarded by

the wearers as a uniform indicative of the military origin of the institution.

"The supporters of this excellent institution for the training of daughters of men of the Brigade of Guards have for the many years of its existence given the most earnest attention to the question of their clothing, and the comparison of the reverend gentleman who so hastily rushes into print might be more worthily bestowed elsewhere.

"I may add that the parents of the junior half of the girls in the home pay an annual sum, and that the home was started over forty years ago by the officers of the Brigade of Guards to take these girls out of barracks.

"They are not orphans, and the home cannot be termed a 'charity school.'

"GEORGE H. MONCRIEFF, Lieut.-Gen.

"38, Thurloe Square, S.W."

Daily Mail, Nov. 15, 1907.

That Amber and Ambergris are either the same substance, or are at least closely allied

Amber is a light, translucent, brittle substance, and usually of a pale yellow colour. Its most familiar use is for making the mouth-pieces of pipes, cigar and cigarette holders. It is the mineralized or fossilized resin of extinct pine trees and was known so long ago as 900 B.C. Even 600 B.C. it was observed by Thales of Miletus that when amber is rubbed it attracts light substances. This is now known to be due to the electrification of the amber by the rubbing. Hence East and West, the ancient and modern, are wedded, for the most modern branch of engineering—electrical engineering—derives its name from the Greek word for amber, *electron*.

Artificial amber is made of copal, camphor and turpentine.

Ambergis, on the other hand, is a waxlike, opaque, ash-coloured, solid which is lighter than water. It has a penetrating, powerful odour, and is much used in perfumery, though its origin would not lead one to expect such a use, for it is a morbid secretion of the liver or intestines of the spermaceti whale.

Its value is about £3 per ounce.

That pen and ink sketches or drawings are etchings

That they are not may be learned from Mr. R. C. Homerton's article on "Engraving" in *Ency. Brit.* The

error is also pointed out in a notice placed with the etchings at the Victoria and Albert Museum, South Kensington.

Ency. Brit., Vol. VIII., p. 443, 10th ed. says, "The English word is merely an Anglicised form of the Dutch word *esten*, which has the same origin as our verb to eat; consequently, unless there is corrosion, or eating away of substance, there is no etching. The word is vulgarly and most erroneously used for pen drawings."

An etching is a print from a metal plate which has been prepared by eating away some of the metal by means of an acid.

That 'Passion-Week' and 'Holy-Week' are strictly the same

"Passion-Week, the name commonly given in England to the week immediately preceding Easter, and otherwise called Holy-Week. But by the proper rubrical usage, Passion-Week is that which precedes Holy-Week, commencing on Passion Sunday, the fifth Sunday of Lent."—*Cham. Ency.*

That the Great Pyramid of Cheops in Egypt and Lincoln's Inn Fields, London, occupy equal areas

We do not know what degree of accuracy is meant to be, or is likely to be understood to be, implied by this statement, but the facts are these:—The area occupied by the Great Pyramid is 13 acres [*Harms. Ency.*], and by Lincoln's Inn Fields, 11 acres [Ward, Lock's *Guide to London*]. An acre is equal to 43,560 square feet. Hence we find that the side of a square containing 13 acres is 756 feet long, while the side of a square containing 11 acres is 693 feet long, a difference of 63 feet in the length of each side, which, it must be admitted, is a fairly considerable amount, even when discussing the dimensions of so large an object as the Great Pyramid!

Sir E. A. Wallis Budge, the Egyptologist, in *The Nile*, gives the present length of each side of the Great Pyramid as 755 feet, but says the length was originally about 20 feet more. Part of this decrease is due to the outer casing of alabaster having been removed. Sir Ernest states that the Mosque of Sultan Hasan is built of stone taken from the pyramids of Gizeh (of which the Great Pyramid is one). The original height of the Great Pyramid was 481 feet. It is now 451 feet.

That dark blue and light blue are the colours of the Universities of Oxford and Cambridge respectively

The author wrote to the *University Correspondent* on the subject, and the editor's reply, which appeared on p. 263 of the issue of Sept. 1, 1909, was, "A University has no colours." Other correspondents have evidently put similar questions, for in the issues of May 15 and June 15, 1911, were these replies :—

"Asphodel.—A University as such has no colours. Persons who are not members of the University of London Union Society should not wear that Society's colours. The matter of a University badge is different."

"J. P.—A university has no colours. When a university or college club has formally adopted certain colours, anyone who is eligible for membership and wears these colours is considered thereby to render himself liable to the payment of the club subscription. There is no reason why any member of the university should not wear the university badge."

Hence dark blue and light blue are the colours of the athletic *clubs* of the Universities of Oxford and Cambridge respectively, and not of the Universities themselves. Consequently a graduate who was not a member of one of the clubs would not be entitled to wear the colours.

That Lloyd's Register of British and Foreign Shipping, and the Corporation of Lloyd's are one and the same body

This mistake has probably arisen from the familiar manner in which both bodies are spoken of as "Lloyd's," for one frequently hears such expressions as "A1 at Lloyd's," meaning the former body, and "Insure it with Lloyd's," meaning the latter body. The Corporation of Lloyd's is a great association of marine underwriters in London, founded at the end of the 17th century, and which used to meet in the coffee house of Edward Lloyd in Tower Street. In 1774 Lloyd's moved to their present home, the Royal Exchange, and they now do practically every kind of insurance as well as marine.

Lloyd's Registry of Shipping is housed in a handsome building in Fenchurch Street, and deals only with the supervision of the design and construction of vessels, and their classification. It has no financial connection with Lloyd's the underwriters. First-class wooden vessels are indicated

in the register by the symbols A1, hence the expression " That is A1," meaning ' excellent ' or ' first class.'

That ' Bar Sinister ' as denoting (in Heraldry) illegitimacy, is correct

Sinister, in heraldry, means left, and dexter means right. The correct expression is ' bend sinister.' The *bar* is a horizontal symbol in heraldry, but when the ' bar ' slopes it is no longer a bar ; it is then a *bend*, and ' bend sinister ' slopes from the top left-hand corner *of the shield* (*i.e.*, from the reader's right hand) across to the edge of the lower right hand quarter (the reader's left).

That African Natives are Lazy

" It is time the fallacy as regards the laziness of the African native were definitely abandoned. Give him an interest in his task, encourage his initiative by making him think for himself, thrust responsibility on him, demand results and not the mere mechanical performance of labour, and he will be found surprisingly industrious."—Capt. C. W. J. Orr, p. 217, *The Making of Northern Nigeria*. The author spent 11 years in Cape Colony, and did not find the natives more lazy than the average workman elsewhere. Capt. Orr realises the secret of getting anyone (and not merely an African native) interested in his work ; and without such interest the task is almost certain to become wearisome, with the result that the individual acts as if he were lazy.

That Mohammedans deny that Women have Souls

" It has been asserted that Mohammedans deny to women the possession of a soul . . enough has been said here to demonstrate the falsity of a belief which assumed the dimensions of a popular fallacy."—Z. Duckett Furiman, pp. 101-2, *Turkey and the Turks* (1911).

" Women who the Lord God have faithfully served, in Heaven take precedence over men who have swerved."—Sir James Redhouse, Oriental Interpreter at the Foreign Office.

The Mohammedans' paradise is full of women, and the author was informed, on May 30, 1920, by Prof. T. W. Arnold, prof. of Arabic, Univ. Coll., Lond., that the Koran early has the words " For believing men and for believing women."

On asking Lord Headley, F.S.E., M.Inst.C.E.(Ireland), a Mohammedan, on Dec. 3, 1915, whether Mohammedans held

that women have no souls, he replied, " Certainly not. Women are welcomed to the mosques, but in the East women are not in the habit of being seen so much as they are in the West, consequently they don't often put in an appearance in the mosques there."

Dr. Coxwell visited Russia from June to Sept., 1915, and in his paper on the tour to the Casual Club, on Dec. 2, 1915, he said he had seen women worshipping in a mosque.

Lady Mary Stuart Wortley Montagu, writing in 1718 from Constantinople to Abbé Conti, said, " As to your next inquiry, I assure you it is certainly false, though commonly believed in our parts of the world, that Mahomet excludes women from any share in a future happy state. He was too much a gentleman, and loved the fair sex too well to use them so barbarously. On the contrary, he promises a very fine paradise to the Turkish women. He says, indeed, that this paradise will be a separate place from that of their husbands ; but I fancy the most part of them won't like it the worse for that, and that the regret of this separation will not render their paradise the less agreeable. It remains to tell you that the virtues which Mahomet requires of the women to merit the enjoyment of future happiness are not to live in such a manner as to become useless to the world, but to employ themselves, as much as possible, in making little Mussulmans. The virgins who die virgins and the widows who marry not again, dying in mortal sin, are excluded out of paradise."

That the substance called Dragon's Blood is in fact the dried blood of a dragon

The first difficulty, if one were to try to dispute the above being a fallacy, is that there are no dragons from which to obtain the blood ! The substance so named is a resin from the cherry-like fruit of *Calamus Draco*, Sumatra.—*Vide Cent. Dic.* II., p. 1756, and *Harms. Ency.* IV., p. 52.

That ' Apothecary ' and ' Chemist ' are synonyms

An apothecary may apply and administer medicines, and determine what ought to be given, whereas a chemist may not (under a penalty of £20) prescribe, but may only prepare, dispense and sell medicines. Apothecaries are governed by the Apothecaries Acts of 1815 and 1874. L.S.A. means ' Licentiate of the Society of Apothecaries,' and legally

entitles the holder to practise as a medical man. The title of this diploma was changed in 1907, as the following letter received from the Secretary in August, 1919, shows :—

" Society of Apothecaries of London,
" Blackfriars, London, E.C.

' LICENTIATE IN MEDICINE AND SURGERY SOCIETY OF APOTHECARIES, LONDON.'

LICENTIATES.

" DEAR SIR,—In answer to your enquiry respecting the new diploma granted by the Society, I beg leave to inform you :—

" (i.) Licentiates who obtained their diplomas since July 1st, 1887, are entitled to this diploma on complying with the Apothecaries Act, 1907.

" (ii.) The General Medical Council, 299, Oxford Street, London, W., charge one pound (£1) for additional registration.

" (iii.) The original registration of L.S.A. is not removed from the Medical Register.

" (iv.) The General Medical Council register the new diploma thus : Lic. Med. Surg. Soc. Apoth., Lond.

"(v.) In signing certificates the letters used should be : L.M.S.S.A.

" Yours faithfully,
" FRANK HAYDON,
" *Secretary.*"

That some persons can swim 3 and even 4 miles in an hour

There is a great difference between swimming *at the rate of* 4 miles an hour and swimming 4 miles in one hour ! For example, the world's record for 100 yards (swimming) is 58 secs., made by R. Cavill in Australia and by De Halmay in Hungary. This is at the rate of one mile in 17 mins., or $3\frac{1}{2}$ miles per hour, but the world's record for the mile is that by B. B. Kieran, also of Australia, whose time was 23 mins. $16\frac{2}{5}$ secs., which is at the rate of $2\frac{3}{8}$ miles per hour. *Two* miles have on rare occasions been swum in still water in one hour.

That a tartan is part of the dress of a Highlander

Formerly the highland dress was all in one piece (like that of some native women in India), buckled round the waist, and then passed over the left shoulder. Now the dress is in two

parts, that round the waist being the kilt, and that round the shoulders being the plaid. The tartan is the characteristic and distinct pattern of the cloth of which the plaid or the kilt is made. Every clan has its own tartan, and many have more than one, for different tartans are, or were, worn by members of the same clan for different purposes or functions, *e.g.*, hunting, balls and official occasions. It is a most common mistake to use the word ' tartan ' as if it were the name of a fabric, whereas it is merely the *pattern* of the fabric. The word is incorrectly defined even in books of reference, though any educated Scot will tell you at once what it means. Natually, Burns used the correct word in his well known poem, " Oh, wert thou in the cauld blast," and which begins thus :—

Oh, wert thou in the cauld blast
On yonder lea, on yonder lea,
My plaidie to the angry airt,
I'd shelter thee, I'd shelter thee.

Sir Walter Scott in *The Lady of the Lake* is somewhat loose in his use of the words ' tartan ' and ' plaid,' which we supposed we should be told is justified by ' poetic licence.' It seems a pity that anything should be allowed which gives a false impression.

In *Canto* III., *stanza* xxvii., we find. " Their feathers dance, their tartans float."

Stanza xxx. : " Then, while his plaid he round him cast."

Stanza xxxi. : " So well was matched the tartan screen."

Canto IV., *stanza* xxi.: " The tartan plaid she first descried."

Canto V., *stanza* xv. : " The gushing flood the tartans dyed."

That being Frozen to Death is very Painful

" The vulgar notion in regard to dying from cold is, that it is one of intense suffering, but, happily, there are good reasons for thinking that this is a mistake. The most painful stage is the first, when vitality is still strong and capable of resistance. We are all familiar with it, as a matter of common experience. When the process is prolonged so as to become dangerous to life, it is accompanied by a progressive insensibility. The vital powers are stolen gradually away, and with them the capacity to feel pain. It is notorious that frost-bite, which is a localised death, com-

monly takes place without the victim's knowledge, and a curious proof occurred a few days ago among a shipwrecked crew, cast ashore in a desolate spot on the Scotch coast. They managed to light a fire and huddled round it, when one of the party noticed that the second engineer's foot was burning. Two toes were found to have been burnt completely off without any consciousness on the man's part, so complete was the insensibility in the frost-bitten limb. Indeed, those who succumb most readily to cold probably feel it less than others, for feeling implies life. And this, perhaps, explains why we never hear of the victims of cold in this country being afflicted by the agonising thirst often described by Arctic explorers as affecting strong men in their mortal struggle with the enemy. The weak die without struggling, and therefore comparatively without pain. They pass away under the influence of cold in what is, after all, a not unmerciful form of death."—*Standard*, Feb. 16, 1895.

That a Red Lion rampant on a gold field is the National Flag of Scotland

The following replies appeared in *Notes and Queries*, Aug. 26, 1916, p. 175 :—

" A red lion within a red double tressure on a gold field was the banner of the King of Scots, and now forms a quarter of the banner of the King of Britain. This flag is strictly analogous to the three lions of the Kings of England ; both flags are royal banners, and not ' national flags ' in the ordinary sense of the term. The national flags of England and Scotland are respectively the crosses of St. George and St. Andrew. The crosses have always been the national flags. In 1606, and again in 1707, they were combined to form the national flag of Great Britain ; St. Patrick's cross was added in 1801, making the British flag of to-day. Cromwell used the crosses of St. George and St. Andrew in the great seal of the Commonwealth instead of the royal lions. It is true that the so-called ' Scottish Standard ' (lion rampant) is frequently flown by undiscerning people in Scotland ; it is a fancy flag, and ' 'cute ' commercialism has prompted English and German flagmakers to foist it on Scotland. But the misuse of this royal flag is condemned by all authorities. See the booklet *The Scottish Flags* (St.

Andrew Society, Glasgow), also *Heraldry in Scotland*, a large work published by MacLehose, Glasgow.

"JOHN A. STEWART.

"The St. Andrew Society, Glasgow."

"I do not think that the 'lion rampant' can ever have been considered to be the national flag or banner of Scotland. That is Azure, a saltire (or cross of St. Andrew) argent.

"May I refer your correspondent to an article of mine on *St. Andrew's Cross* at 10 S. x. 91, where I give an extract from Lord Rosebery's very interesting and amusing address to the children of the Edinburgh Board Schools (early in 1908, I think) on the occasion of his presentation to them, at the instance of the Victoria League, of some fifty flags or Union Jacks?

"Unfurling one of the flags and pointing to it, Lord Rosebery said:—

"'Do you understand what this flag represents? A great many grown-up people do not . . . We begin with the Scottish flag. (*Loud cheers.*) The Scottish flag has a blue ground with a white St. Andrew's cross on it.'

"J. S. UDAL, F.S.A."

The Union Jack, representing the union of England, Scotland and Ireland, was formed by superimposing the national flags of those countries, viz., the crosses of Saints George, Andrew and Patrick.

"The Scottish standard, it should be remembered, is as much a personal flag as the Royal Standard, and should never be flown in street decorations instead of the real Scottish national flag—the white diagonal cross of St. Andrew on the blue field."—W. J. Gordon, in *Flags of the World*.

Mr. Donald Gunn's note agrees with the foregoing.

That an acting manager of a theatre is one who acts, as well as manages a theatre

An actor-manager both acts and manages, but an acting manager is one who takes the place of the manager in the latter's absence, and he does not act.

That our Soldiers when Charging usually run forward

In the *Daily Mail*, July 4, 1916, W. Beech Thomas stated: "In the actual fighting, men do not as a rule double. *Most charges are made at a walk*, or something very like one."

Ten days later, in the same journal, W. Beech Thomas said: "I began this despatch by saying how the Englishmen, in four waves and in open order, marched, or charged, or walked—whichever word is preferred—in a straight, unwavering line into and across the village." In the *Pall Mall Gazette*, June 13, 1917, a couple of paragraphs appeared under the heading *British Bayonet Methods*, in which it was stated: "Our men go forward in a bayonet charge almost at a walking pace, advancing, as it were, behind a hedge of knives." While W. Beech Thomas, war correspondent of the *Daily Mail* (Aug. 16, 1917), said: "For once in a way many of the charging troops really ran rather than walked, and the fastest man won the first rush." The impossibility of much running, except by the enemy, entering into a charge will be fully realised by those who were in the great war, and consequently know the weight and restraint of the full equipment which the men had to carry.

That the Speaker of the House of Commons, by virtue of his office, receives certain perquisites

"The Speaker of the House of Commons issues in a Carlisle newspaper an emphatic denial of an oft-repeated statement that by virtue of his office he receives a present of wine from the State, broadcloth from the Clothworkers' Company, bucks and does from the Master of the Buckhounds, and other perquisites.

"Mr. Lowther states that the assertion is frequently made in the Press on the authority of some anonymous correspondent. 'I should like to see that correspondent and have a few moments' talk face to face with him,' is the Speaker's comment."—*Daily Mail*, Apr. 23, 1913.

That 'Westminster' comprises merely the district round about the Abbey

This mistake is probably less frequently made since the street name-plates in Westminster have borne the addition "City of Westminster," and many have been surprised at the ramifications of the City of Westminster. It used to include even *Kensington* Palace until some years ago when the boundary was adjusted so that Kensington Palace is now in the Borough of Kensington.

"How many people know the full extent of the City of Westminster? The question has arisen owing to a reviewer in the *Observer* doubting Mr. Wilfrid Whitten's statement that a part of the Law Courts was in that city's boundaries. 'John o' London' was, of course, quite able to defend himself, but in last week's *Observer* his defence was reinforced by Mr. G. P. Warner Terry, who, as the last to hold the office of vestry clerk of St. Margaret, Westminster, and also the author of *Story of Greater Westminster*, a work written to refute the late Sir Walter Besant's contention that there was no 'City of Westminster,' may be accepted as one having authority. In the course of an interesting letter, Mr. Warner Terry says:—

"'It is a common error to suppose that "Westminster" merely covered the district round about the Abbey—the present parish of St. Margaret and St. John, with the detached portion of the Hamlet of Knightsbridge.

"'The earliest mention of the boundaries of Westminster is in a charter of King Offa, 785, conferring on the Abbey "quandam partem terrae." This area extended from the Tybourne on the west to the Fleet fen on the east, the Tybourne road and the Old Bourne (Oxford Street and Holborn) being the northern boundary and the Thames the southern.

"'Offa's grant was confirmed by King Edgar in 969 at the instance of the famous Archbishop Dunstan. The whole of Westminster then consisted of one parish, that of St. Margaret.'"—*T.P.'s Weekly*, May 9, 1913.

That a crest is the most important part of an armorial achievement, or coat of arms

The Harms, Ency., III., 400: "By a popular misconception the crest is often supposed to be the most important item in an armorial achievement. This is not so; the coat of arms is complete without it, and in many cases it is absent altogether. Its adoption and its form, even since heraldry became systematised and hereditary, have been more subject to the caprice of the wearer than the bearing of the shield, which can be modified only with the sanction of the heraldic authorities."

That a foundation stone is always left in the place in which it is formally 'laid'

The laying of the foundation stone of an important building is quite a formal affair, and the history of its laying is usually inscribed on it that future generations may readily learn the facts about it, but whatever may have been the practice in early times, the modern stones are certainly not *foundation* stones. For example, the foundation stone of the home of the Institution of Civil Engineers in Gt. George Street, Westminster, is at the right hand side on entering the building, and at least 15 ft. above the foundations. The foundation stone of the South London Hospital for Women was laid at Clapham in June, 1914, on ground which was afterwards excavated for the basement. Consequently the stone had to be moved. 'Foundation' stone is therefore usually also a misnomer.

That a hide of land is equal in area to the hide of an ox

It is always useful to have names which are self-explanatory and precise, hence the appropriateness of this term, for in the *Harms. Ency.* we read :—"Hide of land (*carucata = hide*), a measure of land equal to as much as a plough can plough in a year, and generally consisting of 120 acres, though it varied locally from 40 to 180 acres. It might also include the house and garden of the ploughman"! After this the definitions "as heavy as a lump of lead," "as long as a piece of string," and "as large as a piece of chalk," become positively exact!

According to the *Cent. Dic.*, by derivation the meaning of the word is 'as much land as will support one family'—"variously estimated at 60, 80, and 100 acres, or more."

The author remembers hearing in his boyhood a story about Hengist and Horsa, the Jutes, asking the King of Britain for a hide of land each. The King thought this was so modest a request that he at once acceded to it. They then set to and cut the skin into thin strips, joined these together and claimed all the land that could be encircled by the thongs! This is almost certainly a fable, but not a bad story, which must be the excuse for inserting it.

The *Concise Oxf. Dic.* gives the derivation as from Old Eng. *hid, higid* (*hiw*--household).

That if you insure your property against fire for, say, £1,000 and a fire destroys £1,000 worth of it, you will necessarily be able to recover £1,000 from the insurance company with which the property was insured

It is said that you never know what your fire insurance really covers until you have a fire, and then you are surprised to find how much was *not* covered! The clause which affects the above matter is called the averaging clause which rightly and fairly prevents full recovery where the property was really worth more than it was insured for. Suppose, for example, it was really worth £1,500, but it was insured for only £1,000, and that £1,000 worth of it was completely destroyed by fire. Most insured people think that in such circumstances they would recover the full £1,000 for which they were insured and on which they paid the premiums. This is not so, for the following reason. It is agreed that £500 worth was not damaged, then who is to say whether this particular portion was covered by the policy or not? Why should the company not claim that only £500 worth under the policy was destroyed, and that the other £500 worth covered was that which was saved from the fire? As a fact in this case, on the law of averages, as the policy covered only ⅔ of the total value of the goods, only ⅔ of the *destroyed* goods would be covered by the policy and consequently the just and recoverable claim would be for ⅔ of £1,000, or say, £667.

Another way of looking at the problem is that of the £500 worth saved ⅔ was covered by the policy, as this covered ⅔ of the total value, *i.e.*, £333 worth of the £500 was covered by the policy and was *not* destroyed, therefore the amount to be paid by the Company is £1,000 less £333 = £667 as before. If the whole of the goods were completely destroyed by fire, then the whole £1,000 for which they were insured would be recoverable and the owner would sustain a loss of £500, the amount of the under insurance.

That the Post Office London Directory is an official, Government publication

Its very efficency might give some of us cause to doubt the truth of this belief! It is *used* at post offices and in other government departments, but it is entirely a private enterprise, even though it bears the Royal Arms on its

back. It is published by Kelly's Directories, Ltd. (who publish many other directories), and the 124th annual edition was published in 1923!

That one submarine cannot successfully attack another

Considering the number of submarines engaged during the European War of 1914-18, it is remarkable how rare an engagement was between two submarines, but on August 11, 1915, in the northern part of the Adriatic Sea, an Italian submarine torpedoed and sank the Austrian submarine U12 with the loss of all hands. This fact, without further details, is recorded at p. 217 of *Engineering* of Sept. 3, 1915. An account of another instance which also occurred in the Adriatic appeared in the *Daily Telegraph*, May 29, 1917.

That an Alienist is practically the same as an alien

An alien is a foreigner, but an alienist is a specialist in mental diseases! The late Dr. Charles Mercier, M.D., F.R.C.P., F.R.C.S., was a well known alienist.

That the Bank of England is a Government Institution

It is a private bank which has the Government as a customer, and which for rendering certain services has certain privileges, such as the issuing of bank notes.

That MM. W. H. Smith & Sons instituted the railway bookstalls

The following paragraph appeared in the *Pall Mall Gazette* of Aug. 23, 1918:—

"FATHER OF THE BOOKSTALL.

"It is the general and popular idea that the firm of W. H. Smith and Sons instituted the railway bookstall. As a fact the credit belongs to the firm to which the coming Lord Mayor of London, Sir Horace Marshall, is now the sole proprietor. The first bookstall was established at Fenchurch Street station, and later the contract for the entire Great Western system was secured. Subsequently, the firm concentrated its sole attention on the wholesale trade, and the way was thus left clear for Messrs. W. H. Smith and Son."

Football Fallacies

The following article appeared in the *Daily Mail* of Nov. 3, 1920 :—

" Football Fallacies.

" The ' offside ' law is not by any means the only stumbling block over which the spectators at football matches are apt to trip.

" As is well known, this law has been amended during the past year, so that it is now impossible for a player to be offside from a throw-in, but the rule relating to the throw-in itself is frequently misunderstood.

" At a recent League match at Stamford Bridge the left half-back of the visiting team was the object of much misguided criticism—and that not from what is known as the ' popular ' side of the ground, but from the stand and enclosure—solely owing to the fact that the critics had not a thorough knowledge of the laws of the game.

" Law 5 reads : ' . . . . The player throwing the ball must stand on the touch-line facing the field of play . . . ' and concludes with the words : ' This law is complied with if the player has any part of both feet on the line when he throws the ball in,' so that it is quite clear that it is not necessary for the half-back to keep his *heels* down while throwing-in, provided his *toes* are on the line.

" Because, however, the half-back referred to always raised his heels, the outcry for a free kick for a ' foul-throw ' became persistent and the unoffending linesman was adjured to ' keep his eyes open.'

" Another popular misconception is that the referee has the power to award a free kick for what is called by the crowd ' impeding the goalkeeper.'

" Now, if the laws of the game are searched from end to end, no mention of such an offence will be found.

" Law 8 says that ' the goalkeeper shall not be *charged* except when he is holding the ball, or obstructing an opponent, or when he has passed outside the goal area,' and the expression ' impeding ' cannot be truthfully applied to the case of a forward ' charging ' the goalkeeper when he is waiting to catch the ball or to save a curling shot from the wing.

" If such an offence existed, it would be incumbent upon a forward to get out of the goalkeeper's way and allow him a free field to save or clear, and the forward would be prevented

by the rule from attempting to head a goal close in if the goalkeeper were trying to fist away at the same time.

" On a somewhat different footing may be placed the case of a goalkeeper who some time back got at loggerheads with the centre forward of the opposing team. There had been a number of goal kicks, and the goalkeeper had, as is frequently done, allowed the back to tip the ball to him for him to punt up the field.

" The centre forward thereupon took to standing as near to the goal area as the rules permit each time a goal kick was being taken, thus compelling the goalkeeper to take the kick in the more usual way.

" This apparently so annoyed the goalkeeper that after about half-a-dozen kicks he took advantage of the referee's back being turned and tackled and grassed the forward in approved Rugby style, much to the huge delight of the crowd, who, to judge from the demonstration, had shared his annoyance. Need I add that the centre forward was on the visiting side ?

" Here, again, the spectators were apparently unaware of the fact that the forward was not doing anything contrary to the laws of the game in standing where he did—the law (No. 7) saying : ' An opponent shall not be allowed within 10 yards of the ball until it is kicked off.' "

That pitch or bitumen was used by the Egyptians to preserve their mummies

The material which may be seen to have gradually flowed from some of the mummy cases in the Brit. Museum certainly has the appearance of bitumen, but, " Another novel point of chemical interest is that in no instance has pitch or bitumen been found in the pitch-like material used in preserving human mummies, the material examined invariably consisting of resins or gums which have become naturally blackened by age."—*Nature*, Aug. 19, 1920.

That the leaning tower of Pisa was purposely so built

The piles and earth on the south side gave way when the tower was about 35 ft. high. Additions were made to the height on the south side, tapering to nothing on the north, with the object of once more starting the courses of masonry horizontal, but again the foundation yielded on the south, and the tower was left uncompleted for many years. On

the work being resumed, further additions to the height on the south were made, but for all this the tower is now 14 ft. out of plumb. It is 51 ft. in diameter and 178 ft. high.

The following are too late for classification :—

That the only way to avoid Scurvy is to eat fresh Vegetables

Scurvy used to trouble sailors on long voyages in the days of sailing ships, and it was found that the eating of fresh vegetables, or the drinking of fresh lime-juice, prevented it. It is now known that scurvy is due to the absence of vitamins, and consequently fresh meat, or fresh fruit will also prevent it. Uncooked fruit, and radishes, lettuce, watercress, etc., are better than cooked fruit and vegetables, as the cooking largely destroys the desired effect. No specific organism causing scurvy has been found.

That the Bag-pipe originated in Scotland

" There is reason to believe that the origin of the bag-pipe must be sought in remote antiquity. We are able to trace it in ancient Persia, and by inference in Egypt, in Chaldæa and in ancient Greece. . . .

" That the bag-pipe was introduced by the Romans into the British Isles is a conclusion supported by the discovery in the foundations of the Prætorian Camp at Richborough of a small bronze figure of a Roman soldier playing the tibia utricularis. The Rev. Stephen Weston points out the interesting fact in connection with the instrument, that the Romans had instituted colleges for training pipers on the bag-pipe, a practice followed in the Highlands in the 18th century, and notably in Skye. . . .

" The statement made by several writers on music that a bag-pipe is represented on a contorniate of Nero is erroneous, as a verification of certain references will show. The error is due, in the first place, to Montfauçon, who misunderstood the explanation of Bianchini's drawing which he reproduced." —*Ency. Brit.*, 11th ed. III., 205.

Another account (less authentic) of the history of the Scottish pipes is that they were sold to the Scots by the Irish, and that the Scots have not yet seen the joke !

That a Laughing Jackass is an animal

It is a bird. Under " Kingfisher," in *Ency. Brit.* 11th ed., XV., p. 809b, will be found, " The so-called ' laughing

jackass' of New South Wales and South Australia, *Dacelo gigas*—with its kindred forms *D. leachi*, *D. cervina* and *D. occidentalis*, from other parts of the country—deserve special mention." That is all the special mention they receive!

That the pressure of a liquid or gas in a vessel cannot become great if the valve admitting it under high pressure to the vessel is only a little open

We end with this a dangerous fallacy. However small the hole through which the high pressure fluid passes into the vessel, the pressure in the latter will ultimately be the same as that on the other side of the hole or valve, unless there is a leak from the vessel, or the fluid is one (say steam) which can condense in the vessel fast enough to prevent the pressure rising much. For example, it is dangerous to have radiators for warming rooms connected direct to high pressure steam mains with the valves "only a little open."

Dr. J. A. Rentoul, Q.C. (afterwards His Honour Judge Rentoul, of the City of London Court), lectured on 'Popular Fallacies' at the Birkbeck Institution on Mar. 2, 1898, and the following were the eleven fallacies he dealt with:—

"1. That a thing can be right in principle and wrong in its fruits.

"2. That the results of early training can ever be eradicated.

"3. That young people must sow their wild oats.

"4. That what public opinion decides is right. [Bumble: 'Public opinion is a hasse.']

"5. That right, or truth, can ever be defined. [The Law does not define 'Fraud.']

"6. That there are two sides, and only two sides, to every question.

"7. That we can legislate above the feelings of the people.

"8. That happiness is ever to be gained in this world outside of work.

"9. That wealth is the sole mark of respectability, or else that it is a badge of disgrace.

"10. That a man can ever be persuaded that he is wrong.

"11. That the happiness, prosperity, and joy of this life are in any way injured by the theory that there is a life beyond this one."

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